MARINE REVIEW

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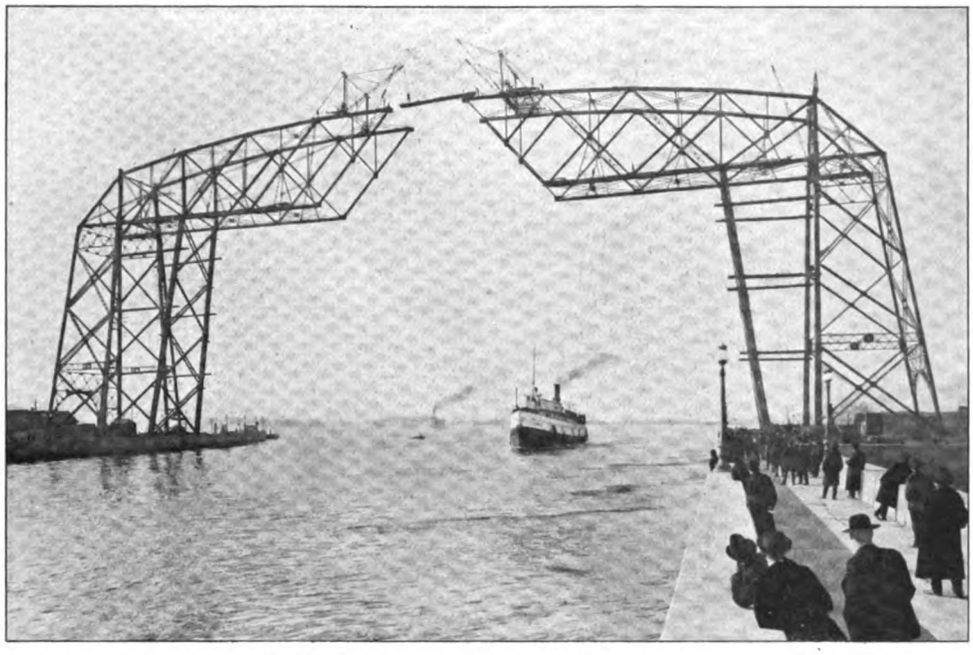
AERIAL BRIDGE AT DULUTH

The aerial or suspended car transfer bridge over the ship canal at Duluth has just been completed by the Modern Steel Structural Co., Waukesha, Wis., though the accompanying photograph shows the structure not quite complete. This bridge is as high above the water as the Brooklyn bridge, so that all vessels may pass freely beneath it. It is 400 ft. long between towers and is erected cantilever fashion. On the lower chords of the span are two tracks carrying sixteen trucks, from which hangs a suspended car 135 ft. below designed to withstand the high Duluth winds. The car is provided with two 50 H. P. electric motors connected to large winding drums which, through the aid of steel cables wound about them, are arranged to pull the car across the canal in each direction every three minutes. The capacity of the car is sufficient to carry 200 people in the cabins and the open space on car will carry one large street car and two or three loaded wagons and teams.



THE AERIAL OR SUSPENDED CAR TRANSFER BRIDGE AT DULUTH.

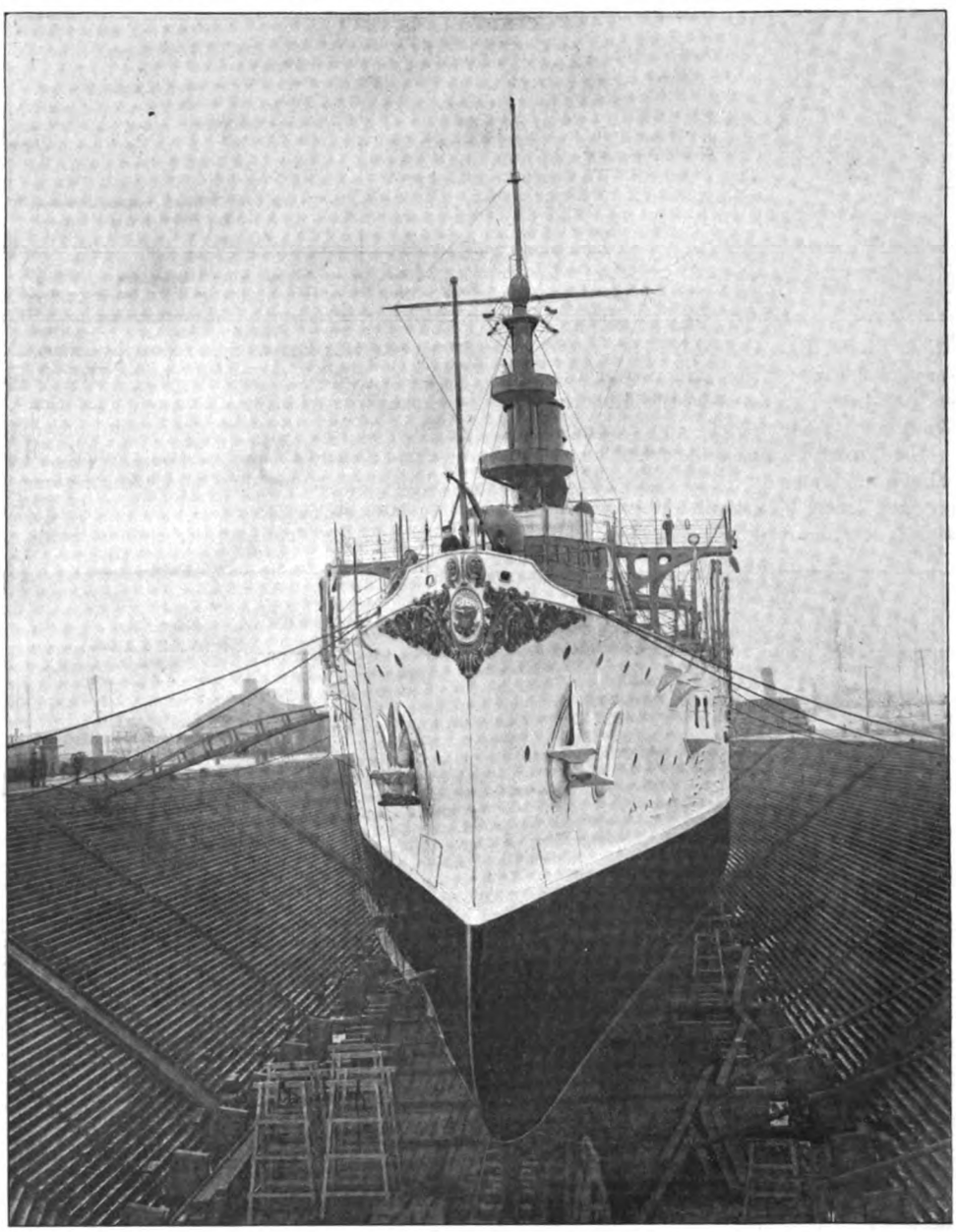
The structure is said to be the first of its kind to be erected in the United States, though there has been for some years one at Rouen, France. The bridge was built in accordance with an agreement made by the city of Duluth at the time the right of way was granted to cut through the ship canal when the city promised a perpetual free ferry service between the mainland and the point thus cut off. The cost of the bridge was $100,000.

Gen. Alexander Mackenzie, chief of engineers, transmitted to congress last week a report by Lieut. Col. Charles E. L. B Davis relative to improving the Detroit river from Detroit to Lake Erie, with the recommendation that the cost be increased from $1,750,000 to $3,750,000 in order to provide a 21 ft channel below the low water plane. The work now being done was planned by Col. Lydecker some years ago, estimated to cost $1,750,000 and for which $1,400,000 has been appropriated, the depth of the channel being calculated from the mean level. Since then it has been found that the surface of Lake Erie has been gradually dropping and that a channel to be effective will have to be 21 ft. below the low water plane, which is 1.1 ft. lower than in the Lydecker plan. It is also proposed to have the channel 800 ft. wide from Bar point to the lake and to change the direction of the channel below Bar point so as to clear the lighthouse which now stands in the way. The increased cost is due to the large percentage of bed rock that will have to be dredged out. At Ballard's reef the increase is estimated at $810,800 and at the Limekiln crossing $270,500.

The steamer Spokane of the Wilson Transit Co.'s fleet hit the mail boat Florence B. last week and put her out of commission. In running alongside the Spokane to deliver mail the Florence B.'s steering cable jammed in the ice leaving her helpless in the path of the freighter, which struck her square on the bluff of the bow and split it for two feet back. The Florence B. was taken to Oades' ship yard and another tug chartered to take her place.

CRUISERS COLORADO AND PENNSYLVANIA

During the past month two Cramp-built cruisers have had their trial trip and one has been launched. The armored cruiser Colorado underwent her trial trip most satisfactorily, averaging 22.26 knots. The sister cruiser Pennsylvania did somewhat better, averaging 22.43 knots. Mr. Edwin S. Cramp was much gratified at the results obtained by these monster fighting machines.



THE ARMORED CRUISER COLORADO IN DRY DOCK.

The Colorado is a twin screw vessel, 502 ft. on the load water line, 69 ft. 6 ½ in. beam, draught on normal displacement of 13,676 tons 24 ft. 1 in. Her full load displacement will be 15,102 tons. Her engines will develop 23,000 H. P. at 22 knots an hour. Her bunker capacity is 1,850 tons. She will have a complement of forty- seven officers and 783 men.

The main battery will consist of four 8-in. breech-loading rifles and 14 6-in. rapid-fire rifles. The 8-in. guns will be mounted in pairs in two electrically controlled elliptical balanced turrets of the Hichborn type, placed on the middle line of the ship, one forward and one aft, each having an arc of train of at least 270°. On the upper deck at the corners of the superstructure there will be four 6-in. guns, mounted in sponsons, one in each corner, and having either a bow or stern fire, with an arc of train of at least 145 degrees. There will also be the gun deck battery of ten 6-in. rifles forming a broadside, five on each side, the arc of fire of each being not less than 110 degrees, or at least 55 degrees forward and 55 degrees abaft the beam, except in the case of the forward pair, which are so arranged as to be capable of direct ahead fire.

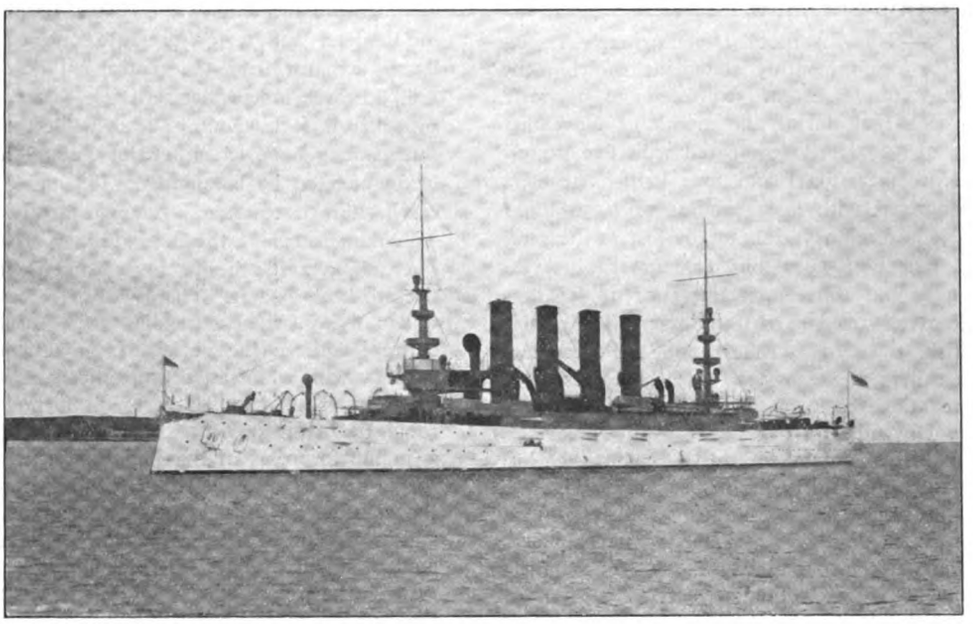
There will be a formidable secondary battery, consisting of eighteen 3-in. breech-loading rifles, twelve 3-pounders, besides four 1-pounder automatic guns, four 1-pounder rapid-fire guns, six automatic guns, two machine guns and two 3-in. field pieces. The 1-pounders will be placed in the fighting tops.

For the guns there will be carried 500 rounds of 8-in. ammunition, 2,000 rounds of 6-in., 4,500 rounds of 14-pounder, 6,000 rounds of 3-pounder and 2,000 rounds of 1-pounder heavy ammunition. The magazines have been especially designed with a view to absolute security in all climates, provision being made to reduce their temperatures, if necessary, by means of connections with the cooling plant.

The armored protection of the Colorado will consist of a waterline belt extending 5 ft. below and 4 ft. above the normal load line and from stem to stern. The maximum thickness will be preserved at 6 in. for a depth of 6 ft. from the top. The armor will taper at the stem and stern to a thickness of 3½ in. The armor on the turrets, with inclined port plates will be 6½ in. thick on the port plate and 6 in. on the sides and rear. At the ends of this armor there will be armored bulkheads 4 in. thick, forming an inclosed citadel or casemate, within which the 10 6-in. guns of the broadside battery are mounted. The four 6-in. guns on the upper deck, at the corners of the superstructure, will be protected by 5-in. casemates. The barbettes of the 8-in. gun turrets will have a uniform thickness of 6 in., and the ammunition tubes, extending from the turret to the protected deck, will have a uniform thickness of 3 in.

The conning tower armor will be 9 in. in thickness, with a 2-in. nickel steel top, and from its base to the protective

deck there will be an armored tube 5 in. thick and of sufficient diameter not only to permit of speaking tubes, etc., but also access to the conning tower from below the protective deck. The armor of the signal tower aft will be 5 in. thick. A complete oil tempered and annealed nickel steel protective deck, 1½ in. thick on the flat and 4 in. on the sloping sides, is to extend the entire length of the vessel, and a cellulose coffer-dam belt 3 in. thick, as an additional protection against water line damage which might affect the stability, will be worked along both sides above the protective deck for the entire length of the vessel.



THE ARMORED CRUISER COLORADO.
[*Built by Cramps, Philadelphia.*

The summary of the trial trip for both vessels is as follows:

PENNSYLVANIA.		COLORADO.	
Legs	Speed, knots.	Legs	Speed, knots.
1 to 2	21.83	1 to 2	21.94
2 to 3	21.75	2 to 3	21.70
3 to 4	22.12	3 to 4	21.69
4 to 5	22.37	4 to 5	22.04
5 to 6	22.00	5 to 6	21.90
6 to 7	22.53	6 to 7	22.31
7 to 8	22.30	7 to 8	22.24
8 to 7	22.58	8 to 7	22.31
7 to 6	22.69	7 to 6	22.45
6 to 5	22.53	6 to 5	22.56
5 to 4	22.97	5 to 4	22.82
4 to 3	23.02	4 to 3	23.33
3 to 2	22.48	3 to 2	22.33
2 to 1	22.97	2 to 1	22.44
Average speed per hour, 22.43 knots.		Average speed 22.26 knots, per hour.	

Both vessels are sisters and, therefore, a description of the Colorado will answer for that of the Pennsylvania.

OBITUARY

In speaking of the death of John Bertram of Toronto, Capt. Thomas Donnelly of Kingston, Ont. said: "Everyone interested in the transportation interests of this country must deplore his death. At the time he was appointed chairman of the transportation commission it was thought by many that John Bertram had not a sufficient knowledge of the transportation interests of Canada to warrant the government entrusting him with such an important commission, but he brought to the task an experience and ability which soon proved to every one interested that he was the right man in the right place. It was evident to everyone that he entered on his duties with an unbiased judgment, anxious to listen carefully to the case as presented by all the interests concerned, and I feel sure that his report to the government would have been of very great value to the transportation interests of this country. Early in the year I had the pleasure, in company with other members of the Dominion Marine Association, of accompanying Mr. Betram to Buffalo, in connection with the changing of the Canadian rules of the road, and I am sure no one present on that occasion will soon forget the evidence which Mr. Bertram then gave of his knowledge and ability. He possessed a fund of general information and any one fortunate enough to meet him was sure to be benefited thereby."

The report of the chief of the bureau of construction and repair of the navy department announces that the 450-ft. collier for the United States navy will be constructed at the Mare Island navy yard. Work will be begun during the fiscal year and estimates for improvements to cost about $232,500 are submitted. $50,000 is required for a new machine-shop and machinery; piers are to be built between the entrances of docks No. 1 and No. 2, so as to provide for the satisfactory berthing of vessels under repair. Building No. 53 is to be remodeled so as to provide for the storage of steel and for a mold-loft, at an estimated cost of $73,000; and the electric workshop is to be enlarged. It is recommended that a fire-proof building for the storage of boats and furniture be erected on the site that will be available after the removal of building No. 98. The rebuilding of the Marine railway is said to be necessary.

Some highly successful experiments with the British submarine B1 have just been completed at Barrow-in-Furness. This submarine, which was launched at Barrow early in the month, is of a new type, and much larger than any submarine yet built. She possesses all the improvements which science and experience with other boats has suggested. She was taken out to deep water outside Barrow harbor and there went through a long series of exhibitions with the greatest possible success, and without the slightest hitch. She remained under water at one time for over three hours and caused some apprehension on board of the tugboat which was in attendance, but she ultimately floated to the surface some two miles away and reported she could have stayed down a much longer time. The great success of these experiments has delighted the admiralty representatives who were present, and it is expected that orders will forthwith be given out for additional vessels of this type.

LIVERPOOL SHIPPING LETTER

Liverpool, Dec. 5.—The Liverpool Underwriters' Association has issued the usual monthly statement showing the number of casualties to vessels of 500 tons and upwards from which it is seen that during the month of November five British sailers of 5,697 tons (compared with five vessels of 6,431 tons in November, 1903) and four British steamers of 7,956 tons (compared with five steamers of 9,250 tons) were totally lost. The foreign vessels totally lost in the same period were eight sailers of 5,940 tons (against twelve vessels of 12,477 tons), and thirteen steamers of 19,334 tons (compared with fourteen steamers of 18,199 tons). The partial losses were: British, twenty-two sailers and 259 steamers; foreign, forty-one sailers and 236 steamers; the losses from all casualties aggregating 588, compared with 553 in November, 1903; 485 in November, 1902, and 556 in November 1901. The total losses numbered thirty, compared with thirty-six, twenty-eight and thirty-six respectively. The nature of casualty is returned as follows: Collisions, 190; strandings, 188; weather damage, 84; damage to machinery, shafts and propellers, 65; fires and explosions, 37; foundering and abandonments, 6; and other casualties, 18.

The output from the Wear ship yards during November was six vessels of an aggregate tonnage of 19,417 tons, as against three vessels of a tonnage of 9,730 tons a year ago. The total output for the eleven months of the current year is sixty-seven vessels of 211,185 tons, as compared with fifty-two vessels of 105,835 tons last year. The Clyde ship builders launched seventeen steamers, totalling in all 25,000 tons during November. In the month they booked orders for about 40,000 tons of new work, chiefly large cargo vessels.

A notable example of quick dispatch worth recording was that of the Dominion liner Canada, at the Huskisson dock Liverpool, last week. The discharge commenced at 1 a. m on Tuesday, Oct. 22, in a gale of wind and snow. The cargo consisted of 24,000 pieces of boards, 11,800 pieces of deals and ends, 10,500 boxes of cheese, 5,100 barrels of apples, 2,800 boxes of Quaker oats, and a quantity of butter and eggs, rolls of paper, etc., totalling 9,500 tons measurement The ship then took on board 2,800 tons of coal and upwards of 1,600 tons of general cargo, and finished 8 a. m. Thursday, Oct. 24, the entire inward and outward operations having occupied only forty-seven working hours. At 10 a. m. the vessel undocked with a large number of steerage passengers on board. The fact that the inward cargo was of a nature requiring much handling and selection adds materially to the merit of what is undoubtedly a smart turn round for a large passenger ship.

The Belgian government, which spares no effort to uphold the reputation of its mail and passenger service between England and the continent, has decided upon the construction of another new turbine steamer. At the present time their channel fleet comprises nine large paddle steamers, of which the slowest attained on her trial trip the speed of 19 knots while the fastest exceeded 22 knots. Gradually the 19-knot steamers on this international service will be replaced by new turbine boats, with a speed of 23 knots an hour, so that eventually, even the slowest mail boats under the Belgian flag will have a speed of 21½ knots, or 24 miles an hour. The steamer which will inaugurate this important departure in the progress of the service is at the present time on the stocks in the yard of the Societe Anonyme, John Cockerill at Hoboken near Antwerp, and will shortly be launched. With luxurious appointments she will surpass all hitherto accomplished in this class of vessel. The cost of attaining the speed of 23 knots—one knot more than the previous record—is that of increasing the horse-power by 20 per cent. The new Dover-Ostend mail boat will be a triple-screw steamer, driven by Parsons marine steam turbines. There will be three turbines —a high-pressure one in the center, receiving the steam from the boilers, and a low-pressure one on each side, driven by the exhaust from the central engine. Consequently there will be three independent driving shafts. The central screw propeller is for steaming ahead, while the port and starboard screws may be used either for going ahead or astern, this being effected by coupling on the main shaft a turbine receiving direct steam, acting independently of the main engine. The dimensions of the new steamer are as follows: Length over all, 357 ft.; beam, 40 ft., and depth from promenade deck to keel, 23¼ ft. There will be three decks, and in addition a flying bridge extending over about two-thirds of the entire length of the vessel. It is anticipated that this new steamer will, while attracting others, more than satisfy those travellers who have hitherto preferred the Dover-Ostend route to other services. All the first-class accommodation is in the fore part of the ship, experience having shown that in the case of turbine steamers this arrangement conduces to the comfort of passengers. The engines will be amidships and as a result of these arrangements the second-class accommodation will occupy the available space aft. The Marconi system of wireless telegraphy will be installed and remain at the service of the travelling public, as on all the Belgian mail steamers. In order to attain the maximum of security the new vessel will be divided into watertight compartments the boat-lowering apparatus will be the best obtainable, and finally, a powerful electric searchlight will be erected on the bridge to sweep the surface of the sea at night.

The steamer Lulu Bohlen, built by Russell & Co., Port Glasgow, and designed on very fine lines as a cargo carrier for a Dundee firm, was launched on Tuesday on the Clyde Her deadweight carrying capacity is about 7,000 tons. During construction the vessel was purchased by the Woermann Line of Hamburg, for one of the largest premiums ever paid for a vessel of similar class. The vessel has been converted partly into a steamer for the conveyance of passengers. The premium is said to amount to $100,000, and it is rumored that the German purchase is for Russian owners.

The imports of raw cotton direct to Manchester via the Manchester ship canal is much brisker this season than it was last. Already considerably over 120,000 bales have been received at the port, which is an increase of close on 40,000 bales compared with the corresponding period of last year The figures of this season are approaching those of two years ago, when the record importation direct to Manchester was reached. Apropos of cotton shipments, one result of the strenuous efforts of the British Cotton Growing Association to secure a supply of British-grown cotton for Lancashire mills is the arrival at Bristol of a small consignment of 28 bales of Jamaican-grown cotton. Samples of the parcel were forwarded to Manchester, and then declared to be equal to anything that had reached that city. The cotton was imported in the Elder Dempster Imperial Direct liner Port Royal, and the succeeding steamers of the line will also have a small consignment of similar cotton on board. The success of the trial crop has created considerable satisfaction in the island of Jamaica, as well as to Lancashire spinners, and this additional means of resuscitating the fortunes of the colony together with the better prospect for sugar planters, will undoubtedly stimulate the capitalists and people of the island to greater efforts in the interest of Jamaica. Sir Alfred Jones, the head of Messrs. Elder Dempster & Co., and president of the British Cotton Growing Association, has expressed himself as highly pleased with the success already attained and spoke very hopefully of the future prospects of the colony.

Andre Gambin, a Frenchman of thirty, claims that he has discovered a means of crossing the Atlantic in a few hours He claims that by his mechanical device a vacuum is created

in front of a vessel, which is practically induced forward thereby, and he says that from experiments he has made an average speed of 625 miles an hour can be attained. At this rate five hours would suffice to reach New York from the British Isles.

Commander Nugent of H. M. gunboat Algerine is to be made the recipient of a handsome gold watch, provided the British admiralty will allow the presentation. Permission has been asked by the United States government which desires to recognize in a suitable way the services he rendered in rescuing the crew, numbering thirty-three, of the American steamer Mineola, which was wrecked on the coast of Kamschatka.

In Liverpool shipping circles at the time of writing there is a report current that all the difficulties in the Atlantic steerage passenger trade have now been removed, and that a revised scale of rates will shortly be issued under which a differential rate will be quoted for the slower boats of the Cunard Line. This was the one point which delayed the completion of the agreement, and it is satisfactory to know that it is now settled definitely.

The tension of the past few weeks in the ship building trade on the northeast coast has been considerable, but it is now hoped that the threatened strike will be averted. Although a compromise has been arrived at, it is by no means a guarantee that the men will become amenable to reason. The retiral of 36,000 men from work cannot be effected without causing an untold amount of distress not only to themselves, but to many thousands besides. The men have agreed that there shall be a 5 per cent reduction from piece rates. They also agree to a reduction of 24 cents per week from wages of $6.25 and over, and 12 cents from wages under that amount, but there shall be no reduction from wages of $5.50 and under. The boilermakers have signified their acceptance of the employers' terms subject to the reductions not taking effect until the first full pay in January. The employers have agreed to other trades not suffering a reduction until the first full pay in January. Should these terms be ratified a most disastrous labor war will be prevented, and a heavy blow to the ship and iron trades averted.

Next spring the port of Liverpool will witness a remarkable addition to the unique fleet of ocean leviathans which have the Mersey for their homes, although cradled further north in these islands. In February the steamship Coronia a vessel of 21,000 tons, and 675 ft. in length, will swell the Cunard navy, and in the same month the Allan Line will put into their Canadian service the Victorian of 12,000 tons and 540 ft. in length, the pioneer turbine vessel for the Atlantic or any other ocean service. Later these two vessels are to be followed by twin boats, the Carmania for the Cunard and the Virginian for the Allan fleet. Both these ships are now approaching the launching stage on the Clyde, and both are to be driven by turbine engines. Before the summer too the White Star Line expect to add to their wonderful group of leviathans the Adriatic, practically a twin sister of the Baltic but designed to be slightly faster than the present largest ship in the world. The next maritime sensation will be the advent of the Cunard 25-knot turbine greyhounds, which are to have a length of 775 ft., and are destined to recover for Britannia the blue ribbon of the Atlantic service, and will represent the marvelous development of propelling machinery in our times. It is expected, too, that the Isle of Man fleet of steamers will be reinforced by a 22-knot turbine vessel. He would be a rash man who would declare that finality has been reached in the size of ocean liners; but it is almost startling to learn that Mr. Thomas Andrews, the designer of the latest mammoth ships placed under the White Star flag, is credited with the prediction that the world will see a 1,000 ft. ship sailing the seas in a few years.

BETHLEHEM STEEL CORPORATION FORMED

To the Bethlehem Steel Corporation, successor to the United States Ship Building Co., now in the hands of James Smith, Jr., as receiver, has been granted a certificate of incorporation under the laws of New Jersey. The new company is capitalized at $30,000,000, divided equally into $15,000,000 of preferred stock, bearing 7 per cent non-cumulative dividends, and $15,000,000 of common stock. The concern is to begin business with a paid in capital of $100,000, consisting of 666 shares of its preferred stock and 334 shares of its common stock. The registered office of the company is in Newark, the agent being the Fidelity Trust Co.

The incorporators, each of whom holds 111 shares of preferred stock, and, with two exceptions, fifty-six shares of common stock, are as follows: George R. Sheldon, head of the reorganization committee of the ship building company; Charles S. Fairchild, John E. Borne, Pliny Fisk, Max Nathan and Charles W. Wetmore. The last two, Messrs. Nathan and Wetmore, hold fifty-five instead of fifty-six shares of preferred stock. A board of directors of nine members and an executive committee of three are provided for.

The objects of the corporation, as set forth in its charter, include the buying and selling of and traffic in iron, steel, manganese, nickel, copper, coal, coke, lumber and other metals and minerals, with their by-products; the development of lands containing coal, iron, manganese, nickel, copper, stone and other ores and minerals; to construct machinery, engines, apparatus, locomotives, cars, railroad equipment, docks, elevators, water works, bridges, canals and waterways, except the maintenance of railroads or canals within the state of New Jersey.

Other subjects specified are to manufacture, buy, sell or otherwise deal in ordnance, large and small arms, armor, armor plate, explosives, munitions and stores of war and military, naval, maritime, marine and submarine materials, engines, articles and contrivances of every sort; to design, build, construct, repair, charter or otherwise deal or traffic in ships, boats and vessels of all kinds and their equipments, furnishings and appurtenances, armor and armament, boilers, engines, tackle and apparel.

Sullivan & Cromwell, counsel for the reorganization committee of the United States Ship Building Co., issued a statement which says:

"The board of directors of the new company will consist of nine members, who have been selected in accordance with the plan of reorganization, as follows: George R. Sheldon, Thomas F. Ryan, John E. Borne, Pliny Fisk, C. M. Schwab, Edward McIlvaine, Archibald Johnston, C. W. Wetmore and Oliver Wrenn. The reorganization committee has purchased all of the properties of the United States Ship Building Co. and the shares of stock of the Bethlehem Steel Co., and it is expected that the new company will be vested with the ownership of these properties within a few days.

"The plan of reorganization has been a very marked success, having been adopted by all of the holders of the collateral trust bonds covering the shares of stock of the Bethlehem Steel Co. and by more than 98 per cent of the holders of the United States Ship Building Co. first mortgage bonds.

"Holders of the first mortgage bonds of the old United States Ship Building Co. will receive $9,000,000 in preferred and $6,000,000 in common stock of the reorganized company, for the trust company certificates certifying to their ownership of $15,000,000 old bonds. Practically all of the remaining shares of the new company, $6,000,000 preferred and $9,000,000 common stock, will go to Charles M. Schwab. It is understood that he will receive also more than 60 per cent of the $3,000,000 new bonds in return for cash subscribed for reorganization purposes."

DEVOTED TO EVERYTHING AND EVERY INTEREST CONNECTED OR ASSOCIATED WITH MARINE MATTERS ON THE FACE OF THE EARTH.

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DEC. 15, 1904.

Congress has given the Merchant Marine Commission, which was appointed during the closing days of the last session to inquire into the state of American shipping in the foreign trade, until Jan. 5 to report. The commission was scheduled to report on the opening day of the session but found its mass of data too voluminous to digest by that time. The commission is now engaged upon framing a bill to submit to congress in conjunction with its report and has very wisely decided to weigh, balance and consider every point before it is introduced in the bill. There are many avenues whereby the merchant marine of the United States might be promoted in the foreign trade but serious objections develop to many of them and insuperable objections to some. The commission therefore believes it would be foolish to advocate any measure which would be likely to create as great a mischief as that which it desires to mend. Every form of promotion is therefore being closely scrutinized and undoubtedly the one which will be embodied in the bill will be sound and legitimate from every point of view and leave no retaliatory openings. It would be useless at this time to attempt to discuss any detail of the proposed measure because details are subject to change at any moment. The bill will doubtless be one upon which both parties can with patriotism unite and which, it is expected, will give to the American nation an American merchant marine worthy of the name within a very few years. The merchant marine of the United States in the foreign trade has dwindled to a miserable 879,000 tons as against 14,000,000 for Britain. It is to be borne in mind also that these 14,000,000 of British tonnage is steam whose potential tonnage is fully two and one-half times that of the sailing ship, and that it is almost exclusively employed in the foreign carrying trade. There is no denying the fact that it was liberal mail subvention that gave this splendid procession of steamers to Great Britain. A similar policy will do the same for the merchant marine of the United States.

Another season of lake navigation is over and owners and shippers are taking their reckonings. It is quite clear that lake navigation is far more conservatively conducted than it was in years gone by. Fortunes are no longer to be made in it out of slight or no investment whatever. Nor is it to be now noted for the simplicity of its book-keeping as in former days. In the old days when the captain rendered his report at the end of the season, having paid his bills as he incurred them and having discharged his crew, the owner found himself with a certain sum of money in the bank. This represented what the ship had earned during the season and was distributed, every cent of it, among the stockholders. Possibly there was only one stockholder to distribute it among, but nevertheless it was distributed. Such is not the case today, however, owners proceed now with far greater precaution. As is well known, ships on the great lakes are nowadays built upon the bonding system—that is, they are built upon bonds for a third or one-half their value as the case may be. The bonds are a lien upon the ship and its insurance and quarterly statements of the ship's operations must be rendered to the trust company that negotiates the bonds. The bonds have a firm and fast hold upon the ship of which circumstance the owner is very well aware. His first care, therefore, is for his bonds and he usually contrives that the earnings of one year shall pay the interest of the next, together with the retiring of the customary percentage which is usually 10 per cent. By this process he is forever providing for the lean year ahead. This money must, of course, come out of earnings before any thought is given to the declaration of a dividend. Then a certain sum is annually set aside for depreciation. The percentage actually set aside, however, for depreciation is not large because generally owners feel that the insurance takes care of depreciation in a great measure. However, there is always the deductable average, so called, to be cared for and therefore a certain sum must be annually provided for repairs. Were the life of a steel ship to be the only factor to be reckoned with depreciation under the present system of doing business would be an inconsiderable item. As far as is known the life of a

steel ship is, with reasonable usage, indefinite. However, a steel ship will carry no more than its tonnage allows and many of them are fast becoming too small for profitable operation. The result is that big sums have to be expended to enlarge their carrying capacity if they are to continue in business as money makers. All these things the careful owner has to reckon with and, therefore, the earnings of a ship have to be set aside for a number of very important purposes before dividends can be declared.

It is generally understood that the smaller ships on the great lakes this year have done little more than break even at the current rates of freight. A few of the larger carriers have paid to their stockholders 10 per cent after having cared for bonds and setting aside the customary amount for other purposes. It is to be remembered, however, that this 10 per cent is upon stock and not upon the whole value of the ship. The foregoing will show that lake carrying trade has taken its place among the sound, stable and conservative trades of the country and that with careful and progressive management reasonable returns are to be expected upon capital invested in it. It is not, however, the road to sudden wealth.

In the annual report of the supervising inspector general of the steamboat inspection service just made public some most sensible observations are made upon the Slocum disaster. In the burning of this steamer 957 persons lost their lives. The observation which the supervising inspector general makes is that the Slocum was typical in construction of excursion steamers generally throughout the country and particularly of New York harbor. This construction is of a highly inflammable character and as they are designed for large capacity and are usually employed to carry women and children, the combination presents elements of grave danger in emergency cases. The supervising inspector general recommends that the construction of passenger steamers of this type be made a special subject for the consideration of congress with a view to making the type more fireproof and as nearly unsinkable as possible. The superstructure of the steamers employed in this service is almost without exception of wood. Fire therefore once started spreads rapidly, owing to the natural draft which is always present. As nearly as possible the superstructure of all these vessels should be of steel and the wood used should be of a fire-resisting nature.

A special dispatch from Washington announces the appointment of Charles H. Eckliff of 440 Putnam avenue, Detroit, as United States inspector of boilers in the Grand Haven district. He succeeds Henry Bloecker, who was recently removed from office by Secretary Metcalf of the department of commerce and labor. Eckliff was at the head of the list of eligibles. The vacancy in the office of inspector of nulls in the Grand Haven district to succeed Thomas Honner, will be filled as soon as the examination papers can be gone over.

ORE SHIPMENTS DURING 1904

The total ore shipments for the season of 1904 have been 21,226,591 as against 23,649,550 for the season of 1903, a decrease of 2,422,959 tons. At the beginning of the season no one expected this quantity of ore to be moved; nor would anyone have considered it possible to be moved considering the serious delay in the opening of navigation this year which really did not begin until June 15. A goodly stock pile was left on dock May 1 this year and as furnace consumption was light at the time it looked as though there would be little demand for ore. On July 1 the movement of ore this year was 1,771,726 tons compared with 8,237,927 tons for the same period during 1903. However, trade conditions rapidly improved with consequent demand for ore, and the movement during the months of August, September, October and November were the heaviest ever known in lake trade. It is interesting to note too that they were handled with consummate ease by the existing fleet. The railways were also able to give good service so that delays at receiving ports were not serious. As an instance of heavy shipments, 3,569,432 tons were shipped after November this year as against 1,266,200 tons after Nov. 1 last year, an increase of 2,303,232 tons. As illustrative of the great growth of lake traffic the mere increase of November shipments this year over the shipments of November last year are actually greater than the total movement of ore during the entire season on the great lakes twenty years ago.

By next week the actual amount of ore on dock will be determined, but it is known to be quite heavy and furnaces too are represented as having an abundance of ore at the yards. Experts, therefore, do not expect very much of a movement from dock to furnace until March. Many furnaces are being blown in, however, which have not been in blast for the past two or three years so that the consumption of ore this winter will be exceedingly heavy. As a natural consequence, therefore, stock piles are likely to rapidly diminish during March and April and leave the docks more free for the reception of the ore movement of 1905 which it is believed will be very heavy.

A libel suit involving $22,500, growing out of the sinking of the schooner Melbourne by the steamer Thomas Cranage in St. Clair river last summer has just been settled out of court. By the terms of the settlement the insurance underwriters on the Cranage, through the law firm of Shaw, Warren, Cady & Oakes, have paid between $15,000 and $16,000 in cash to the Whitney Transportation Co., owner of the Melbourne. The sum paid the Whitney Transportation Co. represents the damages to both the Melbourne and her lumber cargo. The boat was raised soon after the collision and taken to Detroit, where she has since remained, no repairs having been made. It is said that she will have to receive an entire rebuild as a result of the accident.

The Wentworth Navigation Co.'s steamer Ocean, trading between St. Catharines, Ont., and Montreal, via Toronto, was burned to the water's edge at Port Dalhousie, Ont., Nov. 18, where she was undergoing repairs. The cause of the fire is a mystery. The Ocean was built at Port Dalhousie in 1872, and was a screw steamer having engines of 100 H. P. Her dimensions are: Length, 137 ft.; breadth, 23.3 ft.; depth, 11.7 ft.; gross tonnage, 684 tons; register tonnage, 454 tons.

L. C. Waldo of the Northwestern Transportation Co. of Detroit gave an order to the Craig Ship Building Co. of Toledo, this week, to lengthen the steamer Waldo 72 ft., making her 472 ft. long and increasing her carrying capacity by about 1,200 tons.

Merchant Marine League of the United States

As noted in the last issue of the Marine Review, Mr. Harvey D. Goulder, president of the Merchant Marine League of the United States, made a trip to Washington in the interests of the league and for the purpose of instituting a general inquiry into the shipping question. As he had several times been asked the aim of the league he thought it best to prepare a general statement setting forth the purpose of the league and what it hoped to accomplish. This statement, the fruit of years of earnest thought upon the subject, aided by the testimony before the commission, is as follows:

"The purposes of forming this league were broadly stated in the resolutions adopted at its formation. The sentiment of the people at large will control, and the more interest taken the more nearly correct must be that sentiment. The decadence of our foreign marine is a fact recognized in political platforms and variously on all hands. The evils are so apparent as to call only for emphasis by considering detail. Whether we will or not, this country must follow the irresistible impulse of events arising out of our condition. Whether we favor expansion or would curb it, our exports and imports do and must continue to grow at a rate alarming when we consider our almost absolute dependence on foreign ships.

"We would eliminate from the discussion such words as 'retaliation' pro or con. There is simply the question of each government doing in commercial conditions that which will benefit its people generally upon the basis and within the limits imposed and approved by accepted practice of commercial nations. With some approach to unanimity and without just offense to any other nation, we are building up a navy which, whether we move hastily or more conservatively in its development, furnishes a potent argument for a merchant marine. Without this, the vocation of our navy is minimized except for purposes of actual war, which seems a questionable justification, so long as we have so little of our own shipping and its foreign adjuncts to protect. A merchant marine also goes with an adequate navy as means of educating a sufficient number of the youth of the country in the art of seamanship, who, in a not impossible contingency, will be prepared, and, as history shows, would be eager to serve the nation should the trial of battle be forced upon us.

"These things go hand in hand: a merchant marine sufficient to prevent undue dependence on foreign help, a navy adequate in time of peace to furnish the assurance, and, where necessary, the fact of protection to our commerce and our ships and goods engaged in it and their terminals, and every manner of adjunct in distant places; sufficient to perform its duty of protection as well as aggression, and with this a reasonably adequate source of supply of officers and men and of transports, scout ships and other adjuncts upon which to draw without delay, should war come.

"This is the problem involved, and the primal and most important object of the league is to impress the lesson that we as a people are vitally interested in this as one of the great questions of the day, growing in importance to the farmer, the miner, the manufacturer, the railroad, to capitalist and to workman throughout the country. To ship builder and ship owner, and the officers and men, it is important as furnishing an avenue of investment and enterprise to which there has been so little attraction under our neglect of the subject, that not a ship for foreign trade is building or under contract in all this land, and for the first time in our history not a square rigged ship (for any trade) was building or under contract this year. We are leading the world in trade and depending on foreign ships to carry 90 per cent of it. We are already employing more officers and men in the navy than are in our entire foreign marine.

MR. HARVEY D. GOULDER,
President Merchant Marine League of the United States.

"The league had its origin in the interior, in the middle west, on the borders of the great lakes, where, with protection by nature and by the coasting laws, a merchant fleet has grown—not fully understood, indeed, but so prodigious in volume and so potent in results as to require little study or thought to recognize it as a great factor — it has been claimed the greatest single factor—in giving the country its industrial position; not to the advantage alone of those immediately contiguous to the lakes, but to the country at large, to substantially all those interests which go to make up our commonalty. It is in the belief that the same good will result to the country as a whole that we would see the foreign merchant marine rehabilitated, with busy ship yards on the Atlantic, the Pacific and the Gulf coasts, with egress in American ships manned by American seamen, for agricultural and manufactured products and corresponding return cargoes; with regular lines established to foreign ports and with American commercial establishments and influence in the busy places of foreign trade.

"The Merchant Marine League of the United States, not in any wise or in any degree soever wedded to a specific method, nor involved in or with any particular interest, seeks to aid in accomplishing this result upon lines and by methods which shall alike be creditable to us as a nation and include the greatest justice and general good.

"How this shall be done is the question. That the neglect has been so long and that the need is so crying, should ad-

monish against hasty action; because conditions have been so changing and solidifying against us for fifty years that it must be no mere fancy or superficial consideration which shall control any mind in judgment or in action. It is simple and easy enough to generalize without going into the subject to consider those difficulties which in everything lie in the way of a plan at once so elaborate, so fixed and so elastic that every phase and condition shall be forecasted and expressly provided for in the first effort.

"Several methods of dealing with this question have been brought forward from time to time. The most prominent are, perhaps, subsidy, discriminating duties, bounties or subventions simply, postal subsidy or subvention, tonnage tax from which to secure a fund providing subvention, free ships, free ship materials. Each of these (and perhaps others) has had its advocates more or less radical or conservative in disparaging every other method than his own as inadequate, or ridiculous or even iniquitous. On a subject which invites a treatise, it is impossible within permissible limits to do more than suggest lines of thought.

"It may be said briefly that much objection has been felt to subsidy or bounty pure and simple, and also it is urged that without government aid at the beginning in some form, extending the broad American doctrine of protection of our industries and commercial interests, the problem is incapable of solution. Discriminating duties have their greatest argument in the thought that in the beginning of our history this means worked well. The essence of just legislation must be in its consideration of and fairness to steam and sail vessels in all trades. Laying aside the question of treaty provision, the serious question arises whether, under present and probable future conditions, there could be either equality of application or adequate result. In the beginning we were an importing, now we are an exporting nation. Discriminating duties would not deal with exports, and nearly half our imports pay no duties. We are looking so anxiously to trade with South America that in one foreign country an association has been formed with the avowed purpose to checkmate the efforts of our merchants in that direction; yet of our imports from South America and Central America, nearly or quite 90 per cent come in free of duty. The practical difficulty presents itself, how we could deal with the question so far as those countries are concerned, with no assistance out of exports and compelled to deal with respect to only say 10 per cent of imports, unless we should levy discriminating import duties against goods in foreign ships which in our own ships would not pay duty. Another objection, by some regarded as of controlling importance and by others as only important and to be considered, is that this plan would require giving twelve months' notice of abrogating numerous commercial treaties (it is said some thirty) and taking our chances of renewing the treaties on terms more favorable to ourselves in the shipping clauses and not less favorable in all other respects.

"Taking the plan of tonnage tax by itself, questions of propriety arise if it should be in the form of essaying a tax on foreign shipping to build up our own. At the same time, we may with all propriety consider that our tonnage taxes are less than those of any other maritime nation (until recently much less than any), so that we are bearing out of the general treasury charges for lighthouse establishment, harbor improvements and in other directions which, in varying degree and by different methods, are in other countries more or less fully covered by tonnage duties or similar charges on shipping.

The free ship method, to change our navigation laws so that ships built outside the United States may come indiscriminately under our flag, has been much urged. This involves the broad questions relating to protection and tariff. The plan of introducing free the materials for ship construction is a modification of the free ship plan. Contention on this is that it does not present a question of raw materials since the materials for a ship represent at least 90 per cent labor.

It is further urged that aside from discouragement of shipbuilding and cognate industries in this country neither of these methods could tend to meet questions of operating ships either in direct lines or in general trade.

"It is not the design, and it would be impossible to set out here even the elements of the various plans or attempt more than to call attention to them and invite that intelligent consideration which will tend to better understanding of the subject, to the end that a wise conclusion may be reached. At the same time the suggestion is permissible that without endeavoring in a servile manner to harmonize incongruous elements, it should be possible to take what seems best of the various plans and thereupon formulate a bill which will at least get the matter started.

"From a study of the evidence taken, it would seem hardly possible to carry the matter forward without government aid, yet it also seems possible to avoid in the beginning any charge, and throughout to avoid any undue burden, on the general treasury, by imposing tonnage dues similar to those abroad and permissible by precedent and under the laws of trade. Speaking generally and assuming, as seems possible, that it can be worked out equitably, it is clear that any aid should be devoted to steamers regardless of speed, and to sail vessels upon proportionate basis of actual service, or, to prevent excessive cost of administration, probably better to be based on approved statistics and tables of comparative ability and service of sail and steam vessels. Every ship receiving such aid naturally would be required to carry mails, but to encourage specific mail routes, with requirement of regular service and stated sailings, must involve corresponding additional postal subventions.

"It is necessary to require the carrying and educating of a proper number of boys or apprentices and further encourage and provide for a naval reserve (following established practice) by providing a moderate direct retainer to officers and men for holding themselves amenable to naval draft; also to provide naval draft for vessels, and make any allowance to American ships in the matter of tonnage dues dependable on their observance of such provisions. Out of the plans urged in the light of the evidence obtained, it would seem that without burdening the treasury and without violating any principles or ordinary rules of maritime nations, necessary subventions can be provided sufficiently to encourage this fundamentally important branch of our efficient commercial life.

"It is important in this connection to present a suggestion upon the law of 1891 for postal subventions, under which the postmaster general is authorized, but not required to enter into postal subvention arrangements according to certain provisions. Under the contract with the American Line, the last report of the department shows that the steamship company received last year less by more than $60,000 than it would under the ordinary rate per pound. But other routes were at the expense of the government compared with the ordinary rate per pound.

"It is not fair to the postoffice department, which every year faces some deficit, to put upon it the burden of experimenting with the extension of our commerce, because that department cannot include in its accounts any credit for general benefits accruing from the establishment of routes, but in its report must deal simply with the postal cost. It would seem that any provision for aid to regular routes by postal subvention should be made mandatory, so that the postoffice department would have no further option or responsibility than to secure the service by the lowest bid, within a maximum, which congress should take the responsibility of fixing.

"While the league in process of forming does not bind it-

self to what the congressional commission may put forward and may properly reserve the right of suggestion and of not unfriendly criticism of what may be put before or be enacted by congress, it must be recognized that the commission is non-partisan, composed of men of great ability and large experience in legislation, who have devoted great labor to the question and are in possession of more data than has ever before been gathered on this subject in this country. It is equally well known that the commission was not selected in furtherance of any special idea and is free from every special influence, and has in view only to accomplish, along lines of broad patriotism, the restoration of this great industry. That any body of men may by any effort at once and by a single bill completely accomplish this can only be supposed by one who has some theory and believes it a veritable panacea, the ignis fatuus of legislations. But with the country behind them and the people in favor of action the congressional commission, now perplexed by so many which will meet the approval of the country and mark substantial advance.

"Any propositions herein are suggestive merely, since it is the aim of the league only to keep forward the subject, and to assist as it may be privileged to do in bringing out the best thought upon it, and to urge action now, and, if it fails presently, then to urge and again urge action until results are obtained.

"The problem is difficult; we must all be willing to hear patiently and give and take in matters of opinion, and to work intelligently as we may, and earnestly through the constituted authorities for the restoration of our foreign marine upon lines of broad Americanism with proper consideration for the just rights of all, and of those proprieties imposed upon each of the family of maritime trading nations. Meantime, there are some specific things which it would seem may be done by common consent. If the Panama canal zone is not so distinctly American territory as that we may apply the coasting laws, still there cannot be tenable objection to passing a specific bill rigidly requiring that material used in the construction of a canal for which the people of the United States are paying, should be carried in American bottoms.

"In the same line of thought comes the proposition that wherever our government has work of transportation, it should be done in American bottoms. This leads to the question how far the government should undertake direct additional operation, the preference being that it is the office of the government to so govern by just and broad laws as to stimulate effort by its citizens rather than discourage by its own competition.

"It is not to be supposed from the foregoing that any member of the league should be without individual opinion. At the risk of repetition, it should be said that the opinion of every member of the league is to be respected; that there will in due course be held meetings, and in the meantime expression of opinion is invited and solicited. The officers of the league have made some provision for furnishing unbiased information and will be glad in response to inquiry addressed to the league at Cleveland, to give such aid as they may be able to in that direction, and it is hoped that out of it all will come the fair expression of a public opinion on the subject of a working plan for carrying a due proportion of the foreign trade of the United States under our own flag.

LENGTHENING FREIGHTERS

As an evidence of the rapid evolution of the lake carrying trade it is only necessary to refer to the number of freighters that are to be lengthened this winter. The most graphic instance of this is the steamer G. J. Grammer which was built only three years ago for Frank Seither of Cleveland at the West Superior yard of the American Ship Building Co. This steamer is now to be lengthened 72 ft. and the work will be done by the American Ship Building Co. at their Cleveland yard. The Grammer is 366 ft. over all and 48 ft. beam. When she is reconstructed she will be 438 ft. long and her carrying capacity will be increased by 1,300 tons. She will be placed in dry dock at Cleveland almost immediately and will be cut into two sections for the insertion of the additional length.

In discussing the decision of vessel owners to lengthen the smaller class of craft Mr. James C. Wallace, president of the American Ship Building Co. pointed to the experience of the steamer Republic. This steamer was practically the first freighter to be lengthened on the great lakes. Prior to her lengthening she represented an investment of about $100,000 and was paying expenses at the current rate of freight. Last winter she was lengthened 72 ft. at a cost of about $70,000 and it is understood that this year she has earned about 8 per cent upon her value, which would be approximately $170,000. She carries 1,300 tons more than she did before she was lengthened at no greater cost of operation. Her carrying capacity in an average season, therefore, has been increased about 26,000 tons, which, deducting unloading charges, would give her an added earning power of $13,000 at the rate of freight prevailing this season.

Negotiations are under way for the lengthening of quite a number of freighters during the winter, so that with new contract work and the extensive repairing which lengthening entails the lake ship yards will undoubtedly put in a very busy winter. These orders prove conclusively that owners of the small class of vessels are determined to diminish as much as possible the disparity which now exists between their craft and the larger and more modern carrier.

MORE CONTRACTS FOR AMERICAN SHIP

The American Ship Building Co. this week closed a contract with the Kelley Island Lime & Transport Co. for a tug and two steel scows, to cost $150,000. The scows will be 180 ft. over all, 36 ft. beam and 15 ft. deep on the sides. They will carry 1,500 tons of stone on 12 ft. draught. They will be the most modern scows on the lakes, as they will be fitted with steam appliances throughout.

The tug, which will be of steel, will be 83 ft. keel, 21 ft. beam and 12 ft. deep. She will have a fore and aft compound engine, cylinders 20 and 40 in., with 30-in. stroke. Steam will be furnished by a firebox boiler 14 ft. long and 11 ft. in diameter, to be allowed 125 lbs. of steam.

The steamer Juniata, building at the local yard of the American Ship Building Co. for the Anchor Line, will be launched Saturday. The new boat will be a duplicate of the steamer Tionesta of the same line. The first of the three steamers which the American Ship Building Co. is building for G. A. Tomlinson of Duluth will be launched at Lorain next Thursday.

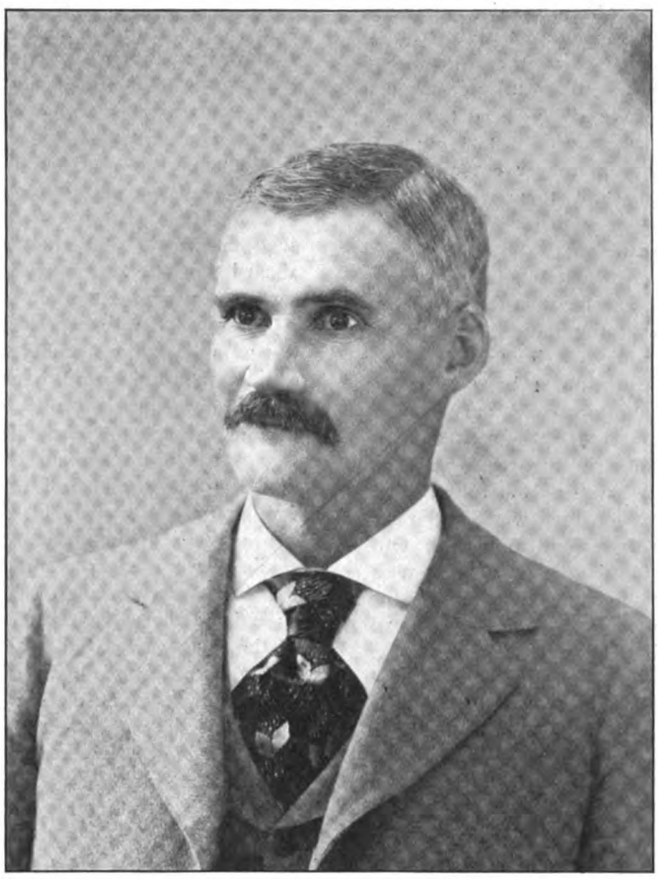
PERSONAL

Mr. George Beasley, formerly general foreman at the Wyandotte plant of the Detroit Ship Building Co., has been given charge of the ship building plant at St. Clair, recently leased by the Great Lakes Engineering Works of Detroit, and will have charge of the construction of the two new Gilchrist steamers which are to be built there.

The Craig Ship Building Co., Toledo, was the lowest bidder for the construction of a tug for government work in St. Mary river. Their bid was $19,800. Other bidders were the Racine Boat Manufacturing Co., Muskegon, Mich., $19,850; Manitowoc Dry Dock Co., Manitowoc, Wis., $23,500; Charles P. Willard, Chicago, $24,975; Pusey & Jones Co., Wilmington, Del., $30,000.

CAPT. EDWARD MORTON

An attempt to write a really illuminating and graphic sketch of Capt. Edward Morton in his absence is met with considerable difficulty. It would probably be met with equal difficulty if he were present because his reserve would keep him from talking. He is a silent, strong man. Anyone who has ever tried to write biography and has read Boswell's Life of Dr. Johnson realizes what a princely work that is. It is giving us an acquaintanceship with Johnson such as no son even has with his own father. We know Johnson more intimately than we know any human being who has ever lived. Yet when Dr. Johnson himself undertook to write biography he met with insuperable difficulties. When he was engaged upon the life of Dryden he was informed that a certain gentleman could relate to him several interesting incidents in Dryden's career and so Johnson hunted up the gentleman. He discovered, however, that all the gentleman knew about Dryden was that when it was cold he invariably sat by the fire at the club and when it was warm he sat by an open window. This is merely intended to show how little we know of each other after all.



CAPT. EDWARD MORTON.

Capt. Morton, as stated, is not a man of many words and therefore it is not surprising that even his intimate associates can say but little when questioned for actual facts. He was born in Wales and was left an orphan at a very early age, coming to this country when about fourteen years old. He was born with a love for sailing, for the first record we have of him is that of a sailor. He was only a lad when the civil war broke out but he offered his services to the government and served on various ships of the navy during the entire engagement. Then he went deep water sailing and on one ship and another visited every known quarter of the globe. His knowledge of seamanship and navigation is profound and as a young man he was known for wonderful agility and enormous strength. He acquired, moreover, an enviable record as a long distance swimmer and the element of great physical strength is with him yet. It is nearly thirty years ago that he came to the lakes and took up the business of sailing on this chain of waters. He sailed in a number of schooners during the early days and proved to be a most competent and fearless navigator. He later took command of steamers, the Sitka being the last which he sailed before he came ashore in 1890. The details of the general management of the Wilson Transit Co. have kept him ashore ever since.

Now this is the kind of man that Capt. Morton is: While he is the general manager of the company, he is ready at a moment's notice to go where the most important work lies, no matter what the physical privations may be. Last week saw him leave for Fort William, Ont., with the W. D. Rees, of which his son is master, after a cargo of grain. The trip was a profitable one because it was hazardous, and because it was profitable and hazardous Capt. Morton personally took charge of it. The Rees is bringing down 190,000 bu. of grain at 4 cents per bushel, which represents a gross earning of $7,600. Capt. Morton is quiet and unassuming and a more sterling character is not to be found along the chain of great lakes.

PROFITABLE YEAR FOR UNDERWRITERS

It is generally believed that the marine underwriters have had a profitable season on the great lakes during the present year. There have been few wrecks of any importance so that single heavy losses have been few. In a measure the brevity of the season has contributed to this condition. During the year 430 disasters were noted in the marine insurance bulletin as against 522 in 1903 and 562 in 1902. The causes of the disasters in 1904 are classified as follows: Collision, 77; ashore, 93; fire, 34; disabled and leaking, 118; foundered, 15; aground, 93. The biggest loss of the year was on the cargo of the steamer F. H. Prince which sank at the Cleveland breakwater, entailing a loss of about $150,000. Lake Erie, as usual, leads in the number of disasters, having 94 as against 80 for Lake Michigan, 52 for Lake Huron, 61 for Lake Superior, 38 for Lake Ontario, 28 for St. Marys river and 80 for the Detroit and St. Clair rivers. Thirty-seven vessels of all kinds passed out of existence with a total tonnage of 17,687. While this number is quite equal to the average of past seasons the tonnage is much smaller. Not a single ship of sufficient size to be a factor in the lake trade was lost.

The stages of water during the year, too, have contributed to the general immunity from grounding. The year has been one of unusual high water, there being 20 in. more water in Lake Michigan, 21 in. more in Lake Huron, 14 in. more in Lake Erie and nearly 3 ft. more in Lake Ontario than in 1895, upon which the reckoning is based. The increase during 1904 covering the entire chain of lakes amounted to about 7 in. on Lake Michigan and about 2 in. on Lake Erie. It seems to be the common acceptance that the stages of water move in cycles and that the high stage cycle is now being experienced.

Capt. Daniel Marsh, one of the best known of the retired lake captains of Wisconsin, died at his home in the village of Wilmot of apoplexy Saturday. The deceased was eighty years of age and had been living at Wilmot since his retirement from the lakes ten years ago.

The steamer W. D. Rees, of the Wilson fleet, is hard aground and out 2 ft. in Lake St. Clair straight channel just above Grosse Point.

TORPEDO BOATS AT SEA

One of the interesting papers read before the Society of Naval Architects & Marine Engineers at its twelfth annual meeting in New York was upon "The Performance of Torpedo Boats" by Lieut. L. H. Chandler. After discussing the subject in a technical way he made the following observations:

"It may be interesting to give at this time some little statement of the performance of the vessels of this type in a seaway. In the first place their period of roll is from 4.5 to 5.0 seconds, and I have seen measured by Naval Constructor Woodward, aboard the Decatur, by means of battens, rolling of an amplitude of 35°, in most moderate weather. I am sure that I have many times seen the boats rolling through a much greater arc than that, although I have always been too much employed with other things at such times to start observations. The bilge keels, however, seem to prevent any great accumulative rolling, so to speak, and there rarely come more than three or four heavy rolls together. There is very little of that continuous and threatening wallowing so well known aboard the smaller vessels without bilge keels, where it seems as if each roll kept getting greater than the one before it until one begins to wonder what the limit is. With the destroyers, three or four heavy rolls will be followed by a very quick extinguishing of the roll, and I have never yet struck a sea in which this was not the case. A very peculiar thing about the roll of these boats is its freedom from jerk at the end. Perhaps a dozen times in the two years that I have been aboard the Decatur it has been too rough to set the dining table, and on those occasions she was far too wet on deck to tempt anyone to leave the bridge for meals. Outside of that we always had our meals with the table regularly set, and there were no racks for the tables in the ship, nor have they ever been needed, outside the few cases recorded. This statement is always incredulously received when made, but it is a literal fact, that, in spite of their heavy roll and quick return, these vessels are very much less apt to throw things about than any other type of ship with which I am familiar. With a head sea, or sea forward of the beam, the rolling is more uneasy than with it from any other direction. Excessive pitching I have never seen, but when running too fast into a head sea, heavy pounding of the bow, racing of the screws, and a pounding of the flat stern into passing seas, all combine to make the conditions almost unbearable, and this state of affairs strains the hull structure very greatly. A ratio of length to beam of 10.6 is too great for that kind of work. With a sea ahead or from forward of the beam, the rolling is the most uncomfortable. With a sea exactly abeam, or abaft it, the boats become most comfortable, as a rule. They seem to rise up and down, without excessive motion, exactly as does a cork. As the sea draws aft they become better and better, and are very comfortable indeed, and seem but little apt to ship water in bulk. With their quick period, a short, steep sea, is of course more trying to them than any other. I have never seen one of them in a full gale in mid-ocean, but under those conditions the sea is always so long that I have full confidence that they would ride it out (preferably with a sea anchor, stern to sea, with oil bags) without excessive danger or discomfort. The worst feature that I have seen in their behavior is the pounding of the flat stern that comes in driving into a head sea, or when at a very low headway in a short steep sea. I have felt the ship when it seemed as if she must surely be pounding on a reef, and have more than once run from my cabin to the deck because of this pounding, when some reason compelled slowing down, fearing that we were aground. This pounding tends to loosen rivets and generally disintegrate the hull structure, especially aft, and I have some fear that, under certain conditions of sea, a breakdown of the engine might result in so much of this hammering as to break up the afterbody of the ship. I am of the opinion, for these reasons, that in a new construction some modification of this stern must be made, although it is so excellent in so many ways that it should be most carefully touched. It is only in forcing into a sea from forward that I have seen any large masses of green water come on board. Of course, with such low freeboard craft there is always more or less water slopping about, spray, etc., if there is any sea on at all, and the personnel will be wet most of the time, but dangerous water very rarely comes aboard, and could always be avoided by changing course, speed, etc. One of the worst features of this wetting business in the flotilla was that the air ports of the Dale and Decatur (secured with two dogs and hinge only) were never tight, and the beds of officers and men, being just below them, were always wet at sea. It was impossible to keep the glasses from cracking, too. The working of the ships at sea would make this trouble. The Bainbridge, Barry and Chauncey, while their port fittings appeared no heavier, had them of a different pattern (three dogs and a hinge) and had no such difficulty. The annoyance and discomfort experienced aboard the first two boats from this trifling cause really became a serious matter.

"Rolling and pitching, as far as the first flotilla went, never caused any serious trouble with the machinery, although the engines required careful handling when racing. The dynamos would sometimes get some water on them, which, of course, did not help them. The hulls also stood the strain very well. In any torpedo vessel, in a rough sea, there is more or less flexion of the hull; and this I find from conversation with foreign officers is true in all services. This does no harm, and is not even alarming to inexperienced persons, unless carried beyond a certain limit. It was seen constantly on all five boats on the trip to Asia. It would sometimes go far enough to start a few rivets leaking or start leaks along butts of the plating to a slight degree, but nothing dangerous. The Decatur and Dale developed slight cracks in some of their deck plating, abreast of and at the bases of the funnels, where the plating is riveted tight to the top of thwartship's watertight bulkheads. These spots being over the boilers, I attribute these cracks to expansion and contraction due to variations in temperature as much as to working in a seaway. They did not run anywhere near the deck stringers, and their progress was in every case promptly stopped by clapping a hard patch over them. It was the unanimous opinion of the officers of the flotilla that they were unimportant.

"Altogether, then, in criticism of the type, with a view to future construction of a similar nature, I would present the following suggestions, in general terms:

"To enable the boats to buck a head sea better, I would like to reduce ratio of length to beam, even at expense of a couple of knots smooth water speed.

"I would like to have coamings on all important hatches about 4 ft. high, and have the fire room blower cowls raised the same amount, to keep loose water above the decks from finding its way below so freely. Hatches would then be kept open much longer than is now the case.

"I would like some modification or strengthening of the stern which would decrease the pounding and consequent shattering tendency to the hull.

"In a following sea, the boats yaw badly, and are very difficult to steer accurately.

"Throughout my experience with torpedo vessels, the health of the personnel has always been excellent, although the men are subjected to many hardships. I have seen quite a number of heat prostrations in the tropics, and the service, if followed for more than a certain length of time (depending on the physique of the individual) will, I believe, almost surely knock a man out. So far as accidents are concerned, we have never had but one permanent injury to officer or man, in any boat under my control, and that was a gunner's

mate aboard the Dale who had a hand torn off in a hawser while the ship was docking. We never had anything more than the most trivial injuries to men below, and have never had any scalding or burning from bad boiler tubes at all.

"It will, perhaps, be interesting to note the sources from which the enlisted men who manned the different flotillas were drawn. In the summer of 1901 I was ordered to command the Bailey, and I was given a crew picked up from about the service generally. But one man in this lot had ever been aboard a torpedo-boat before, and he was a deck hand. Not one of the engineer's force had ever seen a water-tube boiler before. About a month later I picked up a most excellent machinist from the torpedo station, who has been with me ever since. This gave me about fifty men, and by proceeding slowly with them, they were finally gotten into pretty good shape. In November, 1901, I took the Bailey to Port Royal, and there had delivered to me the Shubrick, Stockton, Bagley, Barney and Biddle. These boats constituted a group in reserve which I was directed to care for. With the five boats newly received came about thirty or forty men whom I was allowed to retain. I think it is a high estimate to say that 10 per cent of these men had any knowledge whatever of torpedo-boats before joining those particular ones to bring them to Port Royal from Norfolk and Newport. With the Bailey's crew this gave me about ninety men in all, and the winter of 1901-02 was spent in running the boats in reserve, keeping them in condition, training the men, etc. Loss in men was made up by others sent me by the department, all of whom were absolutely green. Men whom I found to be hopelessly bad were transferred at my request to general service, and their places filled by absolutely green men. This weeding out process, by what may be called selection out of poor material, has been continuous throughout the whole period of my service with the boats, and has resulted in getting a good lot of men at last. Although a slower process than sending men of some experience to the boats, it was the only possible resource where experienced men were not available. In the spring of 1902 the torpedo flotilla (Decatur, Shubrick, Stockton, Thornton, Bagley, Barney and Biddle) was organized, using as a nucleus for personnel the men whom I had at Port Royal. To this small group of about ninety were added about 230 new hands, practically all green, and instruction of men continued. One year later, when the destroyers were commissioned, the men from the torpedo boats were shifted over, with the exception of four men of the old crowd who went into reserve with their small boats. Deficiencies were made up by green men, making a total enlisted force of about 350 men. This lot of men lasted over until August, 1903, when it was decided to send the flotilla to Asia. In order not to send out men who had only a short time to serve, all our short time men were exchanged with other flotillas at home, getting long time men in their places as far as possible. It was impossible to get skilled men to fill places of all short time men transferred, so more green men came in. This general transfer involved about one-third of the flotilla force. With the resultant crews the flotilla proceeded to Asia. Throughout the whole time was kept up the exchange of men known to be bad for green ones about whom nothing was known, and vacancies caused by expirations of enlistments of men who did not care to re-enlist were also filled by other green men. In addition to the facts as here set forth it was also rare that, in getting a new man, we could get one of the desired rate. For instance, if a chief machinist was needed, we would generally consider ourselves lucky if we could get a good bright boy, shop machinist, just enlisted. Coal passers were doing firemen's duty, firemen were tending water, oilers acting as machinists, etc., until they were sufficiently trained to deserve the rates. This, of course, furnished a most excellent school for the men, but the labor and worry of the few experienced men and of the officers was thereby vastly increased over what should be considered normal conditions."

RECEIVER FOR NEAFIE & LEVY CO

One of the oldest ship building firms in the country, the Neafie & Levy Ship & Engine Building Co. of Philadelphia, has found it necessary to go into the hands of a receiver. Judge Davis of the common pleas court of Philadelphia, last week appointed John Grange, a retired banker, and Somers N. Smith, vice-president and general manager of the Neafie & Levy company, receivers. During the fifty years of its existence this company has done splendid work. There are engines doing service on the great lakes today that were built fifty years ago by this company and they are now in just as good condition as they ever were. The embarrassment of the company is due entirely to the dram upon its financial resources by the construction of government craft. The company has the protected cruiser St. Louis of 9,700 tons displacement about two-thirds completed and the construction of this vessel has represented a constant drain upon their resources. The general government is a tardy paymaster and while its payments are certain government work has nevertheless a tendency to cripple any concern which carries forward a great deal of it. This is precisely the case with the Neafie & Levy company which lately completed the protected cruiser Denver for the government as well as several torpedo boats and torpedo boat destroyers. In addition it has three steel tugs to construct for the government. The company will continue business as heretofore and expects to meet all of its engagements. The assets of the company far exceed its liabilities but are not at present available.

LAUNCH OF SCHOONER DOROTHY BARRETT

Quite a large crowd gathered to witness the launch of the new five-masted schooner Dorothy B. Barrett from the yard of G. G. Deering at Bath, Me., recently. The launch was of especial interest owing to the fact that the vessel is the largest craft ever constructed by Mr. Deering and was named in honor of Dorothy B. Barrett, daughter of Henry W. Barrett of Boston. The Barrett is the fifteenth craft built by Mr. Deering since he started in business on his own account in 1886. The Barrett is 250 ft. long, 45 ft. beam and 25 ft. deep. She is fitted with all the latest improvements, including a complete Hyde Windlass Co. outfit. The products of the Deering yard since it was organized have been as follows:

Name.	Rig.	Built.	Tons.
John O. Haynes	3m	1887	850
Reub. L. Richardson	2m	1888	97
Ellen Lincoln	2m	1888	97
Horatio L. Baker	3m	1888	829
Lydia M. Deering	4m	1889	1225
John S. Ames	4m	1889	964
Wm. C. Tanner	4m	1890	1034
Wesley M. Oler	4m	1891	1061
John S. Deering	3m	1891	479
Edwin R. Hunt	4m	1892	1133
David P. Davis	4m	1893	1231
Lewis H. Goward	4m	1895	1191
Edward E. Briry	4m	1896	1613
Henry O. Barrett	5m	1899	1807
Malcolm B. Seavey	4m	1901	1248
Mary F. Barrett	5m	1901	1833
Fairfield	3m	1902	564
Gardiner G. Deering	5m	1903	1982
Dorothy B. Barrett	5m	1904	2088
Total tonnage			21,316

Recapitulation: Two two-masters, five three-masters, eight four-masters, four five-masters.

CANADIAN MERCHANT MARINE

The annual report of the marine department shows that Britain and its colonies headed the maritime states of the world with a total tonnage of 11,014,790 on the first day of the present year, or a little more than four times that of the United States, which stands second on the list. Canada's tonnage was 683,147, which places it eighth on the list or immediately behind Russia and ahead of Sweden and Spain. The tonnage of Canada is growing. During the past year 184 new vessels were added to the list. This increased the tonnage by 30,534 tons. At the beginning of the present year the total number of vessels on the register books of the dominion was 7,020 measuring 683,147 tons register tonnage. The number of steamers was 2,419, with a gross tonnage of 338,251 tons. Assuming the average value to be $30 per ton, the value of the registered tonnage of Canada would be $20,494,410. The number of new vessels built during the past year was 328 measuring 30,323 tons, which at a value of $45 per ton would be $1,364,535 for new vessels. By provinces the Canadian tonnage is as follows:

	Net. tonnage.
New Brunswick	59,508
Nova Scotia	216,053
Quebec	138,570
Ontario	169,086
Prince Edward Island	13,739
British Columbia	76,215
Manitoba	7,695
Yukon District	2,281
Total	683,147

In 1874 Canada's tonnage was 1,158,363. It kept growing yearly until 1878 when it reached 1,333,015. This was the highest year. It was also the year in which Canada adopted protection. From 1878 down to 1900 there was a gradual decline each year. In 1900 the tonnage was at its lowest mark, 659,534 tons. There has been a slight increase each year since then and the current year will show a larger growth than the past.

CANADIAN SHIPPING NOTES

The tonnage of coal brought into Montreal from Cape Breton during the season of navigation 1904, amounted to over 1,400,000 tons.

The Sovereign Fire Insurance Co. of Canada, Toronto, will apply next session of the dominion parliament for power to carry on a marine insurance business.

The dominion government steamer Aberdeen got caught by the ice in one of the locks on the Lachine canal on her way to Toronto. The trip to Toronto was undertaken for the purpose of getting new boilers installed. The steamer will now have to winter in Montreal, and no work will be done on her until spring.

The Hamilton Steamboat Co.'s steamer Macassa will, during the winter, have a section of 36 ft. added to her length, amidships. The whole of her internal accommodations will be remodeled and her engines and boilers will also be overhauled and renewed. When she is placed on her run next year she will be practically a new vessel. The work will be done by the Collingwood Ship Building Co. at Collingwood, Ont.

The steamers running between Toronto and Hamilton had an extra long season this year, the Macassa keeping up a daily trip until Dec. 5, while the Turbinia went into winter quarters about a week earlier. The travel between Toronto and Hamilton has been heavier than before, and with three steamers running during the summer, all appeared to be getting as much as they could do.

The upper lake season for 1904 generally has not been so prosperous as was hoped, although all marine men having started out with the certainty that it would not be so good as that of 1903. The addition of new vessels made in 1903 made a lot of difference to the general carrying trade, while the travel to the St. Louis exhibition drew away a lot of the usual summer passenger trade. The extension of the season by the use of a steamer for breaking ice at Fort William, Ont., enabled the steamers to get out a lot of grain and but little will be left for the rail to bring down during the winter.

AROUND THE GREAT LAKES

The Anchor Line steamer Tionesta will be laid up in Cleveland. She will be thoroughly overhauled during the winter.

The Reid Wrecking Co., Sarnia, Ont., has received a contract to release the schooner John Kelderhouse, ashore on North Point.

Navigation between Detroit and Cleveland closed for the season this week. Both steamers of the Detroit & Cleveland Line are tied up at Detroit.

The Neshoto, coal laden, stranded on the La Salle street tunnel last week, the first vessel to do so this season. Westerly winds had lowered the water.

A revision in colors of the chart of Eagle river, Mich., has just been issued by the United States lake survey and is now for sale by the Marine Review.

The steamer W. L. Brown was placed in dry dock at Lorain this week and thirty plates will have to be removed. The Brown went ashore on Pan Cake shoal on the last trip down and had to lighter 1,000 tons of ore.

The steamer W. D. Rees of the Wilson fleet, is hard aground and out 2 ft. in Lake St. Clair straight channel just above Grosse Point. The steamer ran out of the channel while bucking 6-in. ice and the ice-crushing steamer Promise and the lighter Newman have gone to her relief.

Judge Seaman of the United States court at Milwaukee, has taken under advisement the suit of the Milwaukee Tugboat Co. against the Pere Marquette Co. for salvage as recompense for services when the ferry No. 19 was on the rocks at Fox Point last February. The bill is $13,000.

The Barnett & Record Co. of Duluth has been awarded contract by the Duluth & Iron Range railroad for the reconstruction and extension of ore dock No. 3 at Two Harbors. The cost will be $300,000 with $50,000 additional for raising the railroad yard to correspond with the increased height of the dock.

The American Ship Building Co. will make extensive repairs on the steamer S. S. Curry at its Cleveland yard this winter. The Curry is owned by H. A. Hawgood and when she came out in 1893 was the largest carrier on the lakes. At that time her engines were placed amidships. The alterations proposed are to remove her engines and boilers to the stern after the prevailing manner on the lakes.

The old Troy-Wilbur-Martha collision case is now in the supreme court of the United States in the shape of a writ of certiorari filed in the United States supreme court by the owners of the steamer Troy. During the trial of the case at Detroit it was alleged that the Troy and Wilbur were racing when the latter collided with the barge Martha, but in Judge Swan's decision the Troy was absolved from all blame and a verdict of $43,000 damages was rendered against the Wilbur. The matter was carried to the court of appeals at Cincinnati and this tribunal held that the Troy and Wilbur were equally at fault, thus dividing the damages between them. A decision handed down by the court of appeals in admiralty cases is generally accepted as final, but it appears the Western Transit Co., owners of the Troy, was not satisfied, and desire a hearing before the highest court in the land.

SUMMARY OF NAVAL CONSTRUCTION

The monthly summary of construction, prepared by the bureau of construction of the navy, shows the customary progress upon naval vessels, about 2 per cent. Following is the summary:

		Degree of completion, per cent. Nov. 1,'04.	Dec. 1,'04.
	BATTLESHIPS.		
Ohio	Union Iron Works	100	
Virginia	Newport News Co.	71.21	73.43
Nebraska	Moran Bros. Co.	61.4	63.64
Georgia	Bath Iron Works	67.47	69.67
New Jersey	Fore River Shipbuilding Co.	70.7	72.2
Rhode Island	Fore River Shipbuilding Co.	73.5	75.1
Connecticut	Navy Yard, New York	56.04	58.71
Louisiana	Newport News Co.	61.5	64.73
Vermont	Fore River Shipbuilding Co.	25.8	29.5
Kansas	New York S. B. Co.	31.2	35.6
Minnesota	Newport News Co.	46.56	50.24
Mississippi	Wm. Cramp & Sons	11.89	15.26
Idaho	Wm. Cramp & Sons	10.61	13.4
	ARMORED CRUISERS.		
Pennsylvania	Wm. Cramp & Sons	94.79	97.03
West Virginia	Newport News Co.	95.5	97
California	Union Iron Works	65	66.7
Colorado	Wm. Cramp & Sons	97.11	98.42
Maryland	Newport News Co.	92.16	93.41
South Dakota	Union Iron Works	63	64.1
Tennessee	Wm. Cramp & Sons	54.58	58.71
Washington	New York Shipbuilding Co.	50.2	55.3
	PROTECTED CRUISER.		
Chattanooga	Lewis Nixon	97	99.13
Galveston	Wm. B. Trigg Co.	94	95
St. Louis	Neafie & Levy Co.	54	56.6
Milwaukee	Union Iron Works	60	63.2
Charleston	Newport News Co.	84.34	86.06
	GUNBOATS.		
Dubuque	Gas Engine & Power Co.	68.2	72.8
Paducah	Gas Engine & Power Co.	64.9	68.4
	TRAINING SHIPS.		
Cumberland	Navy Yard, Boston	80	85
Intrepid	Navy Yard, Mare Island	63	67.5
	TRAINING BRIG.		
Boxer	Navy Yard, Portsmouth	90	95
	TORPEDO BOATS.		
Stringham	Harlan & Hollingsworth Co.	99	99
Goldsborough	Wolff & Zwicker	99	99
Blakely	Geo. Lawley & Sons	99	99
Nicholson	Lewis Nixon	99	99
O'Brien	Lewis Nixon	98	98.5

WORK AT NEWPORT NEWS

Newport News, Va., Dec. 14.—The keel for the new cruiser type of Lake submarine boat will be laid at the yard of the Newport News Ship Building & Dry Dock Co. in the next few days, possibly the latter part of this week. Several frames for the cruiser have been put together and material for the vessel is arriving at the yard daily. According to a statement made by inventor Simon Lake, who has been here for several days, the cruiser, when completed, will be sent across the ocean under its own power and without convoy. The ocean trip probably will begin at some point on the coast of Newfoundland. The vessel will have a cruising radius of about 2,000 miles instead of 1,000 as currently reported.

While here Mr. Lake personally superintended a trial run up the James river of the new submarine Simon Lake X. The craft presented a strange sight as it sped up the river with only the conning tower and about a foot of the hull showing above water. The vessel's motors were adjusted during the trip, necessitating considerable time in completing the course. Inventor Lake said on the return of No. X. that the trial was satisfactory in every way and that the boat showed indications of developing more speed than was expected of it. There was no submersion during the voyage up the James as the trial was made merely to test the motors and steering gear. The boat's gasoline engines were tested while the Lake was moored to a pier at the ship yard. Mr. Lake said his vessel would be prepared for the government trial as soon as possible and it is probable that the next ten days will see everything in readiness. Three uncharged torpedoes have been received at the ship yard from the Norfolk navy yard to be used in the test of the new boat. The government test will be rigid, as the navy department has mapped out a long program of requirements to be met by the Simon Lake X. The inventor is exercising the utmost care in "tuning up" his vessel. The Lake was floated into dry dock No. 1 Sunday to have her hull painted and balancing wheels placed on her keel.

The new Lackawanna ferry boat Scranton will be given her trial over a course in the James river tomorrow, being manned by a crew of picked ship yard mechanics. The Scranton has been overboard a little over a month and the work has been hurried in order to make room at the pier for her sister, the Elmira, which is now on the ways. A dock trial of the ferry boat's engines proved satisfactory. Tomorrow, engines, boilers and steering gear will be thoroughly tested and the steamer will be given a speed trial. Messrs. Harvey, Lee and Loomis, representatives of the Lackawanna railroad, were here Saturday inspecting the four ferry boats building for the company.

Fred J. Gaurtlett, local auditor of the Newport News Ship Building & Dry Dock Co., has returned after spending six months in Europe on business for his company. Mr. Gaurtlett declines to discuss his trip in detail. He said he was well satisfied with his mission abroad. It has been rumored that Mr. Gaurtlett would bring back with him several important contracts, which, on account of their nature, must not be talked about at this time. Mr. Gaurtlett would not throw any light on the rumors.

The armored cruiser Maryland, sister of the West Virginia, has been in dry dock several days having bottom cleaned and painted and propeller blades adjusted to proper pitch. The Maryland's engines are about ready for a dock trial. Both turrets are in position and the work of placing armor around them has just been completed. The West Virginia probably will be placed in commission early next month. Nearly the entire crew for the cruiser has been assembled at the Norfolk navy yard. The battleship Louisiana is now more than 60 per cent completed and leads the Connecticut at the New York navy yard by 5½ per cent. The conning tower has been placed in position on the battleship Minnesota, the only warship on the ways at the yard. The ship is about 50 per cent completed and will be ready for launching about the middle of January. Struts and propeller shafts have been placed and the work of putting on the lighter armor around the gun stations in the unprotected part of the ship is under way. The battleship Virginia is now about 72 per cent completed and has in place all of the armor on the water line belt. The funnels are almost completed and soon will be placed. The electric searchlights for the ship have arrived.

A persistent campaign, in which shipping companies of Newport News and Norfolk, the federal authorities and the local police will co-operate, will be waged against the system of "crimping" sailors now successfully carried on by sailors' boarding house keepers at both ports.

UNIFORM SPECIFICATIONS

Mr. W. D. Forbes' paper upon "Uniform Specifications" read at the recent meeting of the Society of Naval Architects & Marine Engineers in New York will be read with great interest by contractors. It was as follows:

"Some time since, a paper was read before this association on 'The Interchangeability of Units for Sea Use.' The idea was favorably received. The advantage of interchangeability of parts as well as units is certainly recognized as a furtherance of engineering work. With these facts in mind, it is now proposed to carry the idea further and discuss the advantages of interchangeability of specifications. It must be admitted that there is no sound reason why a steam engine, for instance, should not function equally well if ordered by one person or by another, provided running conditions are the same. It would seem that if a corporation could accept an engine complying merely with certain restrictions of weight, space and revolutions, without any regard to the material used, except that it be 'first-class,' another could accept it without going into the detail of babbitt metal, steel, or composition entering into its make up. It is self-evident that a firm constantly bending its attention to the manufacture of a high grade machine will understand more thoroughly what is needed in its construction than an outsider.

"It will, of course, be admitted that there are certain demands which must be met in special places, as, for instance, naval or merchant marine. Some are liberal in permitting manufacturers to use well tried material not exactly meeting specifications, and some will pass engines which do not fill the requirements as laid down in specifications, but it is held that such procedure is manifestly wrong. The function of a specification is to specify; it should not demand information which is a trade secret or which cannot be imparted without practical demonstrations and experience, or something which prohibits obtaining the desired results, as for instance that 'a hard sound casting for cylinder be furnished,' and exacting that no scrap metal be used, and that the mixture of iron be clearly given. No foundryman would be willing to undertake to make a close, hard, iron cylinder without scrap, and few are willing to instruct others how to make castings, and very few, to tell the truth, are able to impart the knowledge.

"Some buyers are very exacting about the babbitt metal, allowing only 2 per cent of lead, while others make no demand as to this metal. A babbitt with but 2 per cent of lead is good for certain positions, but is not good for high speed work, and if pounding in is required, at least 20 per cent of lead should be allowed. Pounding babbitt should be resorted to only to get a solid box; making hard spots in a babbitt bearing by pounding is self-evidently a bad plan.

"A pig of babbitt is supplied, and a chemical analysis shows it to meet the specifications, bearings are poured of it, and it is supposed that the desired mixture is used, but this is not so, as a chemical analysis of the babbitt from the bearing will show that the original mixture does not exist, as much of the tin has gone up the chimney in melting. Here the buyer expresses a desire for a certain mixture, and then knowingly accepts something else.

"Nickel steel is an article often demanded in engine specifications; its value cannot be questioned in many cases on account of its strength, but on small forgings there seems to be endless strains set up which no amount of annealing removes. Some articles seem impossible to make of this material when of small area, and retain their shape; whether ground or turned the springing seems to continue even when no forging is done. In nickel crank shafts of about 3 in. in diameter, great difficulty is encountered by the continual spring of the forging as the several cuts are taken, and very true cranks are hardly obtainable. That crank pins must line and be true cylinders, is a perquisite of an enduring engine, and as in small engines it is quite easy to design a shaft which if made of but ordinary machinery steel will stand all possible strains and service, a party who does not demand nickel steel is getting by far the more reliable articles.

"Many compositions demanded by the buyers are too hard, the formula 88-10-2 mixture is reported to be popular mainly because it is never furnished. It is a mixture which is very difficult to machine, and for high speed bearing is never employed in commercial work. In the bearings of a wood working machine, where lasting qualities are of great moment, nothing but babbitt will be found with never less than 20 per cent of lead in it. In fact it is held that the size of bearing has far more to do with its lasting qualities than the material of which it is made.

"Probably the question of what is a right and what is a left-hand engine will be a continual source of argument with many, unless the turbine comes to the rescue; but one would suppose that this could be clearly settled by each engine builder. In one specification this is to be found: 'When a person is standing at the commutator end and the direction of rotation is against the clock, the plant is right-handed.' While this is incorrect, it is a clear description of what the parties choose to call a right-hand engine, and one which could be furnished without further question.

"The wording in some specifications is hard to understand, as for instance the following: 'The lower side of the combination bed plate to be planed perpendicularly to the line of the stroke of the engine.' This might mean that the bed plate is to be set on edge in the planer and its bottom planed with a down feed—all it really means is that the bed plate is to be finished on its bottom.

"As to what may be properly termed 'first-class' in material is open to debate, but certainly anything may be properly called so which has proved satisfactory in the past, and met the requirements of strength and endurance for a long period.

"That weight, space, and lasting qualities are matters of great moment, especially aboard ship, is admitted, and it is, of course, necessary to have a clear statement of what is allowable, and to know the exact conditions under which a machine is to operate either afloat or ashore, before a design can be made or a bid given. It is sometimes claimed that a bond guarantee should be furnished by a manufacturer and he be left free to select all materials and designs, and some very successful buyers do thus order and accept articles, and it is hard to see why all should not adopt the same system; but failing this, why not adopt the other system of nominating everything and having some uniform chemical or physical tests which would pass all material, no matter where it goes or for whom it is ordered. Either condition would result in work being gotten out with less loss of time and at less expense, but one or the other system should be general.

"If the latter system is decided upon, it could only be with the one desire that the very best is to be obtained; no other possible motive could be ascribed to its advocates; but it places the buyer in the position of nominating what should be used and then holding those who furnish it responsible, not a tenable position; while if the former system is adopted, the desire that the best be given is far more likely to result in success, as there is then no possible division of responsibility, and the experience of those most interested would be made available.

"It would certainly seem that the bonded guarantee system would present to the navy allurements. The endless detail now imposed on officers as to material would be done away with. The experience of the navy is free as air to us and all nations, and this, coupled to commercial experience and engineering ability, must result in manufacturers turning out mechanical contrivances which will fill all requirements, as their very existence would depend on so doing.

"The necessary time now required for inspection in detail

would be saved, and the time question will shortly become of far greater moment than it is now, in naval construction.

"A writer in the Army and Navy Gazette attributes the satisfactory and remarkable freedom from breakdowns in the Japanese navy in the present war, to the 'liberality' shown builders in designs and selections of material; but a large factor may be the absence of the enterprising newspaper reporter.

"To conclude, it is held; first, that if there is a specification for an article it should be lived up to or the article be entirely rejected, and no responsibility should rest on the maker of an article except for good work, if accepted; second, if there is no specification the maker should be held responsible by bonds for the satisfactory working and lasting qualities of the articles; third, that one or the other method should be adopted."

CIRCUMNAVIGATING THE GLOBE ON A LOG

Capt. Voss, who circumnavigated the globe "on a log," recently gave his experiences to an audience. The "log," by the way, was not in its original forest condition, but was hollowed out and shaped by Columbian Indians over 60 years ago. It had been a huge cedar, but, as navigated by Capt. Voss, its length was 30 ft., with a maximum beam of 6 ft. The weight of the "log" was 2½ tons. There had been no intention of making a sailing craft of the tree, but the seaman who determined to do so decked it over, fitted up a little deckhouse to sleep in, set up three small masts, on which he spread 38 sq. yds. of canvas, and after making everything ready for a long voyage, started from British Columbia on May 21, 1901, accompanied by a young journalist.

Sailing west, the strange ocean-going craft reached New Zealand safely, went on to Australia, the Hebrides, and other South Sea islands; navigated the Torres Straits and the Indian ocean; called at Pernambuco, and arrived in English waters after a 40,000-mile cruise. This occupied three years, into which period some remarkable experiences were crowded. Not the least distressing and alarming was the loss of his companion, who, in a seaway, was jerked overboard, carrying with him the only compass on board, which he was at the time holding.

This lamentable accident happened some 1,200 miles from the port of Sydney, N. S. W., and Capt. Voss had to retrace his steps—or resail his track—toward that place, where he refitted and secured a new companion. Later on this person had the misfortune to fall overboard, but by swimming with a line to his assistance the intrepid navigator got him on board again. As a seaman, Capt. Voss undoubtedly learned more of the behavior and handling of a small vessel than he even thought possible at the commencement of his perilous journey, for, needless to say, he went through every possible sort of weather. As a result of his experience in the "log," he is convinced that any kind of boat would float at sea if properly handled. He certainly tested the immense value of a sea anchor, about the efficacy of which there can be no two opinions; he sang its praises in no uncertain strain. But every seaman believes, with the Geordie skipper, that "you may capsize a vessel, but you'll never upend her," and with her head kept to the sea by an efficient sea anchor a boat can live through any sea if she is not overladen, and particularly if supplied with oil for "laying" the breakers.

The Elder Dempster Steamship Co. in its direct line of service from Jamaica to Great Britain has with its new main line steamer Port Kingston cut down the time of passage from thirteen to ten days. Sir Alfred Jones, the projector of the line, intends to reduce even this record, for he is now asking for tenders for a couple of steamers to be equipped with turbine engines.

SPEEDY MOTOR YACHT

One of the largest and most substantial motor yachts for pleasure purposes that have been built this year has just been completed by the Electric Launch Co. of Bayonne, N. J., for Raymond Hoagland of Red Bank, N. J. The boat is 80 ft. long and 11 ft. wide, and will be used next season almost exclusively on the Shrewsbury river. The yacht had the first trial on Newark bay and her 90-H. P. automobile motors developed a speed of between 16 and 17 miles an hour. When the engines are in thorough working order, it is probable that this rate may be slightly increased.

Mr. Hoagland has named his new yacht the Hurrion. It has a raised deck and cabin house, possessing all of the conveniences to be found on a small steam yacht. Forward of the pilot house is a bridge deck, where the boat may be steered as well as from the pilot house. Below the bridge deck is an engine room, and there are sleeping quarters for the engineer and two members of the crew. In the main saloon arrangements have been provided for four berths, Pullman folding berths being attached to the sides of the cabin, while the owner has a private stateroom, its length being the entire width of the boat. The power equipment of the boat contains some novel devices. A storage battery, which acts as live ballast, is placed beneath the cabin floor, and has sufficient power to operate an electric fan, affording a constant draft of fresh air and perfect ventilation. There is also an electric air compressor, and in the galley of the yacht is a complete electric cooking equipment, including a stove, broiler, chafing dish, urn, and plate warmers. The boat can carry 700 gallons of gasoline, enabling it to cruise at full speed for 600 miles without refilling the tanks. The yacht carries two small boats, one an auto tender with a 5-H. P. engine capable of accommodating five passengers, and having a speed of 7½ miles an hour.

MEAN STAGES OF WATER

The gauge records of the United States lake survey show the following mean stages of water above mean sea level for November, 1904:

	Stages during Oct.	Higher than during same month last year.	Lower than during same month last year.	Higher than during Oct., 1895.	Lower than during Oct., 1895.
	Feet.	Feet.	Feet.	Feet.	Feet.
Lake Superior	603.21	0.03	.....	0.36	.....
Lake Michigan	580.75	0.61	.....	1.66	.....
Lake Huron	580.96	0.55	.....	1.70	.....
Lake Erie	571.91	0.14	.....	1.21	.....
Lake Ontario	*246.32	0.88	.....	2.91	.....

*Approximate only, owing to wreck of pier and carrying away of gauge house during storm of November 12-13.

Present fall Lake Huron to Lake Erie, 0.41 ft. more than a year ago.

Gardner & Cox, naval architects, engineers and yacht brokers, No. 1 Broadway, New York, have just issued a little catalogue descriptive of yachts recently designed by them. The description includes the Aztec, 263 ft. over all, 216 ft. water line, 31 ft. beam and 14 ft. draught; the Margaret, 176 ft. over all, 145 ft. 11 in. on the water line, 21 ft. beam and 11 ft. draught; the Coranto, 150 ft. over all, 120 ft. water line, 19 ft. 5 in. beam and 8 ft. 5 in. draught; the Privateer, 176 ft. over all, 160 ft. water line, 24 ft. 6 in. beam and 11 ft. draught. Other designs included the Elsa II., Dodger, Atlantic, Wettemoe, Irondequoit, and Aspirant. The Atlantic has been an especially serviceable vessel, being a three-masted steam auxiliary vessel, and equally as satisfactory a cruiser under sail or steam. Her machinery consists of a triple-expansion engine supplied with steam, with two Almy water-tube boilers.

TRADE NOTES

The Skinner-Chuck Co. of New Britain, Conn., announces that their catalogue of lathe, drill and planer chucks will be mailed upon receipt of request.

John H. Dialogue & Son, Camden, N. J., have just finished the new ocean going tug boat Lenape for the Philadelphia & Reading railway.

The Harlan & Hollingsworth Co., Wilmington, Del., has been given a contract for the construction of a fire boat for the city of Washington at a cost of $49,500.

The five-masted schooner Samuel J. Goucher was launched from the yard of H. M. & R. L. Bean, Camden, Me., for the Coastwise Transportation Co. Her dimensions are: Length, 271 ft.; beam, 48 ft.; depth, 27 ft.

The American Ship Windlass Co., Providence, R. I., has a great deal of work under way for the government and among other things are to supply windlasses for the battleships Connecticut, Tennessee and Vermont.

More Penberthy automatic injectors are sold every year than any other injector known. The Penberthy injector is standard among engineers. The Penberthy force feed lubricator gives a positive feed of oil and can be regulated to a fraction of a drop.

The Buckeye heater manufactured by Walter Macleod & Co., 463 E. Front street, Cincinnati, is one of the greatest of labor savers. It takes the heat to the work as it is practically a large blow pipe giving a hot, powerful flame which can be adjusted to the exact spot requiring heat.

Two steel tugs, built by the Neafie & Levy Ship & Engine Building Co. for the Standard Oil Co., were recently given trials on the Delaware river and proved very satisfactory. They have been named Atlantic and S. O. No. 11. Their dimensions are 90 ft. long, 20½ ft. beam and 10½ ft. deep.

The contract for rebuilding the steamer Mohawk of the Central Vermont Line has been awarded to John Robins, Erie basin, Brooklyn, N. Y. The Mohawk was recently burned at New London, and the contract states that she shall be put in the same condition as prior to the fire, which destroyed her cargo and much of her hull.

The yacht Edithia, owned by J. H. Hannan of the New York Yacht Club, will be lengthened 24 ft. this winter by the Gas Engine & Power Co. and Charles L. Seabury & Co., Consolidated, Morris Heights, New York, and her present kerosene engine will be replaced with a steam engine. The Edithia at present measures 114 ft. 8 in. over all, 103 ft. 5 in. on the load water line, 16 ft. beam and 5 ft. draught.

The N. Richardson Sons Manufacturing Co., Gloucester, Mass., has been incorporated. They are manufacturers of various devices used on board ship including patent steering apparatus. The new company has been fortunate in making a working agreement with the Marine Hardware Co. of Peabody, Mass., which deals directly with ship chandlery firms. James S. Donovan, Peabody, Mass., treasurer and manager of the Marine Hardware Co., has been elected president of the new corporation.

Kieley & Mueller, 7-17 West Thirteenth street, New York, are manufacturers of steam specialties for all services in heating and power installations. Their specialties are the products of both professional and practical engineering skill. Their waste heat utilizer and double tank for utilizing waste heat have been installed in a number of places in New York. Their combined muffler tank and grease extractors are also in general use. Their specialties have been in service for the past seventy-five years and their merits are fully established.

The Westinghouse Electric Mfg. Co. recently made public a resolution of the board of directors authorizing the sale of $15,000,000 5 per cent twenty-year debenture bonds at such times and in such amounts as the board should decide. The money is for working capital. The directors anticipate a large increase in the company's business resulting from the introduction of a single phase system in the operation of interurban railways by the conversion of steam into electric roads in addition to the natural increase in the electrical field.

Thomas Drein & Son, Wilmington, Del., report the following orders in hand: Thirty-two 22-ft. patent beaded galvanized steel metallic life boats for steamers building by the American Ship Building Co. on the great lakes; two 22-ft. patent beaded steel life boats for export to Venezuela; two 16-ft. metallic life boats for Wever & Son's tug boats, Baltimore; four 14-ft. metallic life boats for new ferry boat in New York; two 18-ft. metallic life boats and one 10-ft. metallic life boat for Erie Ferry Boat Co. of New York; eight 16-ft. metallic life boats for the new Hoboken ferry boats of New York.

Although times have been somewhat hard during the past season, the Almy Water-Tube Boiler Co. of Providence, R. I., has received a fair share of patronage. Among the later installations of their justly celebrated boiler was one for the steam yacht Katrina of Hartford, one for the tug Howell, one for the Peruvian government disinfecting boat, two for W. D. Forbes Co. to be placed in a gold dredge for South America and in the steamer Sagamore of the Newport & Providence Railway Co.'s fleet. The boiler for the steam yacht Llewellyn is ready for shipment and two boilers for the Peary's arctic exploration ship are well under way. Officers of the company say prospects for the coming year are very promising.

CHICAGO GRAIN REPORT

Chicago, Dec. 13.—The season of lake grain shipping out of Chicago terminated on Dec. 10 with the expiration of hull and cargo insurance. Final chartering closed on the basis of 2½c. Buffalo corn for cargoes of reasonably prompt handling at destination.

The interest will now turn to matter of "winter storage" offerings, and from all indications early January will develop a very favorable demand. Shipping quarters announce that the movement of country corn toward Chicago during the next month will be unusually heavy—probably aggregating 700,000 to 1,000,000 bu. daily.

The closing shipments, compiled by P. H. Fleming & Co., were thus distributed: via all rail lines of wheat, 260,000 bu.; corn, 890,000 bu.; oats, 820,000 bu.; barley, 100,000 bu.; via lake to Buffalo and other American ports: wheat, 90,000 bu.; corn, 520,000 bu.; via lake to Canada points, 105,000 bu. corn.

Lake and Rail Shipments:

	This week.	Last week.	Same week last year.
Wheat	349,439	526,680	237,916
Corn	1,510,892	2,302,253	520,095
Oats	822,107	826,009	809,232
Total	2,682,438	3,653,942	1,567,243

	Shipments since Jan. 1, 1904.	Same time last year.
Wheat	17,064,356	23,871,097
Corn	70,199,450	88,929,402
Oats	44,001,959	61,865,719
Total	131,265,765	174,666,218

Stocks of Grain in Elevators:

	This week.	Last week	Same week last year.
Wheat	3,709,000	3,867,000	5,571,000
Corn	1,793,000	1,328,000	4,054,000
Oats	8,586,000	9,104,000	3,353,000
Rye	436,000	443,000	368,000
Total	14,524,000	14,742,000	13,346,000

MARINE REVIEW

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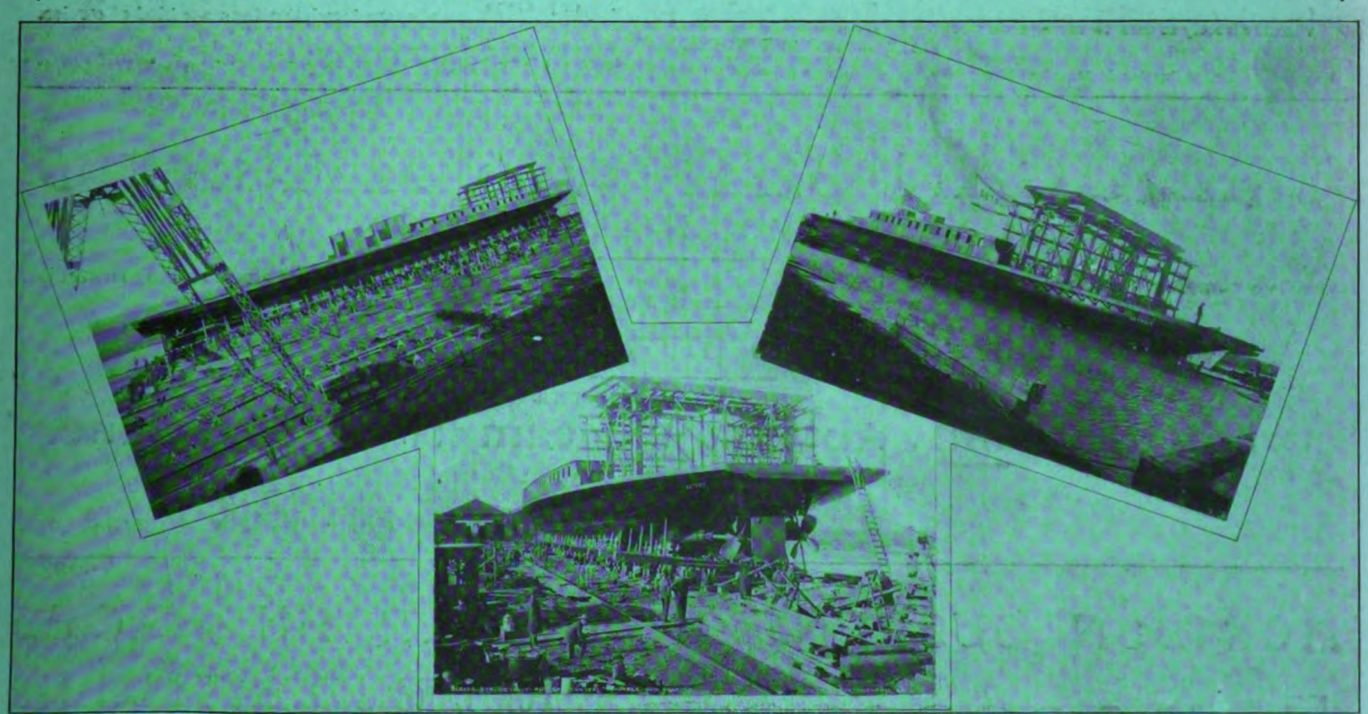

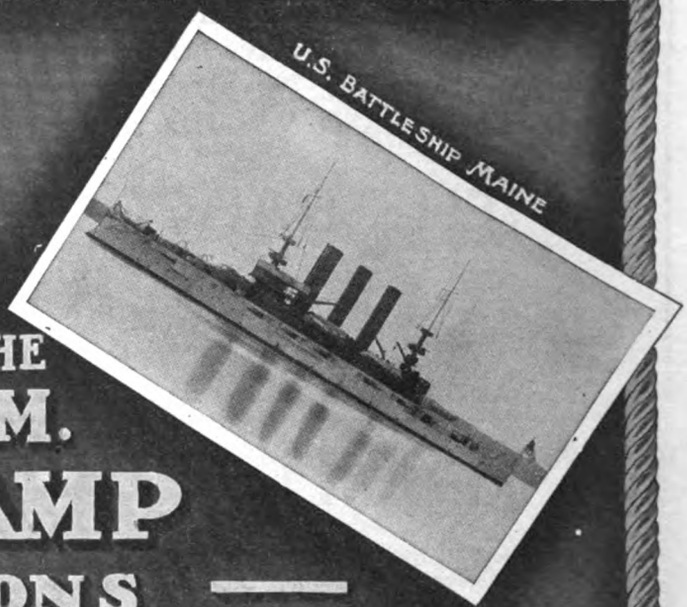

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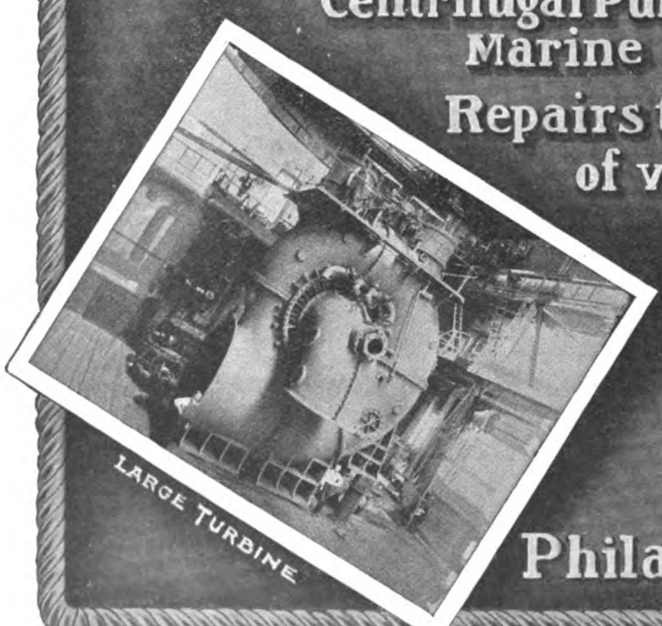

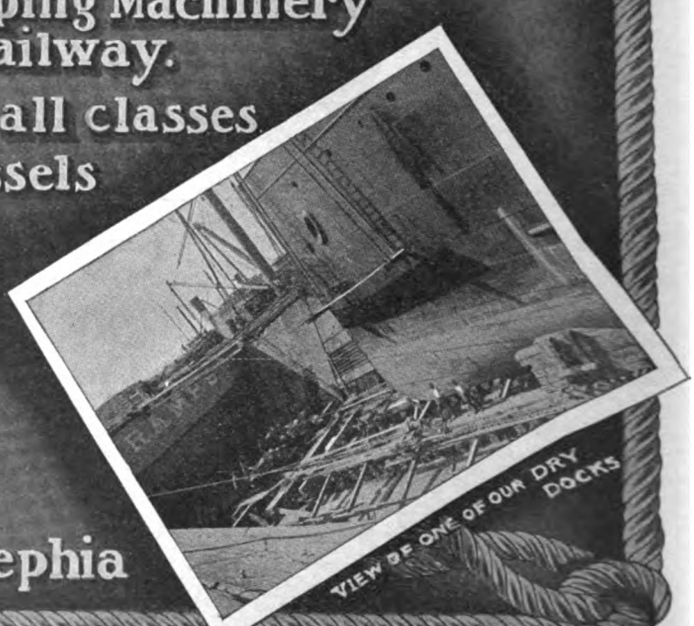

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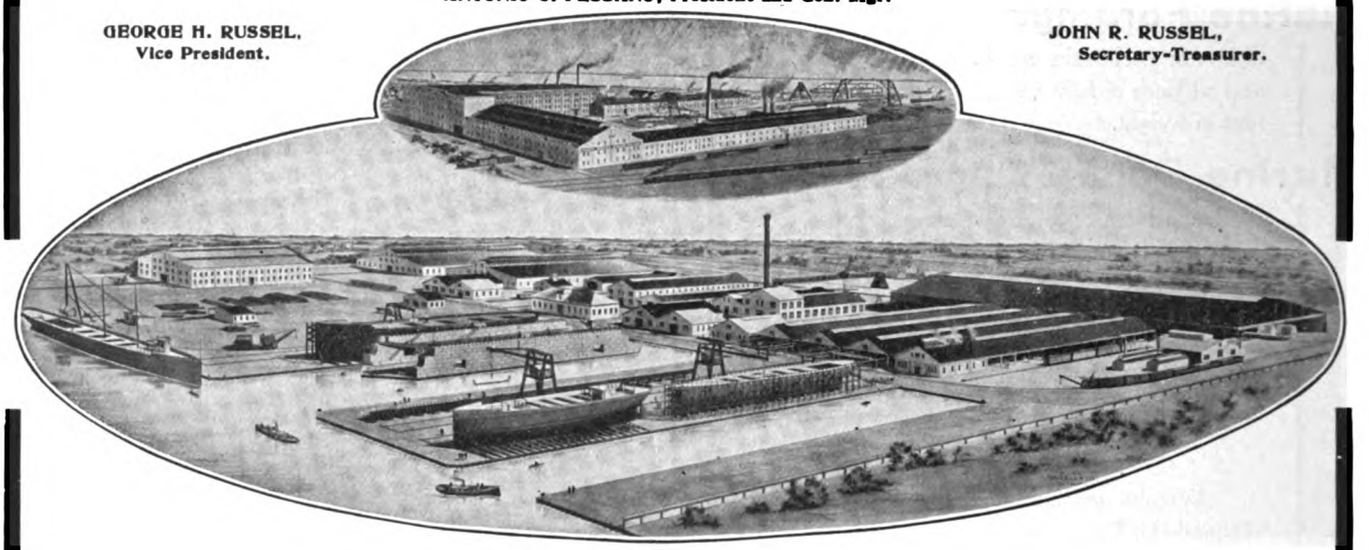

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On Board Sea-going Vessels, NOT INCLUDING New Installations Building or Erecting.

French Navy	355,560 H. P.
English Royal Navy	966,300 "
Russian Imperial Navy	224,500 "
Japanese Imperial Navy	122,700 "
Austrian Imperial Navy	56,700 "
Italian Royal Navy	13,500 "
Chilian Navy	26,500 "
Argentine Navy	13,000 "
The "Messageries Maritimes" Company	87,600 "
Chemins de fer de l'Ouest: (The French Western Railway Co.) Steamships plying between Dieppe and Newhaven	18,500 "
Total Horse Power of Boilers in Use	1,884,860

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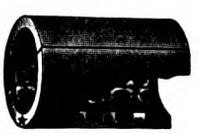

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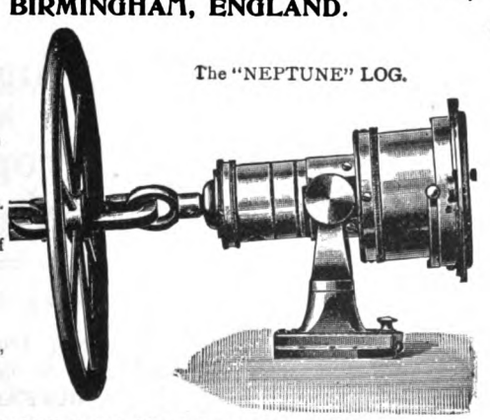

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Two Scotch marine boilers on dock of the Craig Ship Building Co , at Toledo, O. Dimensions 8 x 12 ft; two 3 x 9 furnaces; 92 x 3½ in. tubes; check valves and blow off valves safety valves, six cast iron cradles for boilers to rest on; steam pipe connections. All in good re pair. Guarantee boilers to stand 140 lbs. hydraulic pressure. Address Capt Geo. P. Felcher, East Tawas, Mich. Dec. 22

Submarine Drill Boat for Sale.

New submarine drill boat for sale. Hull 72 ft. by 24 ft., 5 ft. sides. Enquire of Hickler Bros., Sault Ste. Marie, Mich. tf

Steamers for Sale.

Steamers Russell Sage and John C. Gault Complete fit-out for package freight. For particulars apply to A. W. Colton, Gen. Mgr., Toledo, O Jan. 5

Wrecking Plant for Sale.

For Sale—Our entire wrecking plant, consisting of he wrecking tug Henry W. Johnson, wrecking pumps. submarine diver's apparatus, pontoon and chains, hydraulic jacks, purchase blocks, etc.

Also one 6x12 ft marine boiler and 18x 20 in. marine engine, heater, etc Miscellaneous lot of anchor chains, deck pumps. winches, etc

Michigan Wrecking & Salvage Co., Detroit, Mich. Dec. 15

Barge and Scows for Sale.

Coal barge, 850 tons ; dump scow, 750 yards ; deck scow 650 tons. Address Vanderbilt, 126 Liberty St , New York Dec. 15

PROPOSALS for Barges and Boats. U S. Engineer Office, Custom House St Louis, Mo., Dec. 5, 1904. Sealed proposals, in triplicate, for furnishing Wooden Flat Barges, and Wooden or Steel Flat Boats, will be received here until 12 M Jan. 4, 1905, and then publicly opened. Information furnished on application. THOS. L. CASEY, Major, Engrs. Dec 29

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Excursion Steamer Ottawa.

Capacity on excursions 350 persons. Freight 100 tons. Speed 11 miles.

Equipped with electric plant, searchlight, steam steerer, ash-gun, patent anchor, etc.

Cabin finished in quarter sawed oak and leather.

Will sell cheap.

Address Box 701, Grand Haven, Mich. Dec 22

Yacht for Sale.

For Sale—A seventy ft. water line gasolene yacht, whose engine room and engines have been practically cleaned out by fire, has been taken over by an insurance company and will be sold. The hull of this boat is as good as ever Except for the damaged engine room the craft is in good shape. For plans and particulars address C W. Estabrook, Colonial Bldg., Boston, Mass.

Marine Engine for Sale.

One fore and aft compound marine engine Cylinders 27 x 50 x 40. Enquire of the Montague Iron Works, Montague, Mich. Jan 26

FOR SALE.

Boiler for Sale.

8x15 Marine boiler for sale. It has ninety-two 4-in. tubes; thickness of plate ⅝ steel; double riveted; double fire doors; size of dome 3 ft. 3 in. by 7 ft. 10 in. Boiler as good as new. Will sell it at a bargain—$1,000.

Also one 8 H. P. marine engine, $50.

Address I. Applebaum, 38 Randolph St., Detroit, Mich. tf

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See accompanying index of Advertisers for full addresses of concerns in this directory.

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Dake Engine Co.....Grand Haven, Mich.
Great Lakes Engineering Works.....Detroit.
Mietz, Aug. .....New York.

AIR PORTS, DEAD LIGHTS, ETC.
Marine Mfg. & Supply Co.....New York.

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Fore River Ship & Engine Co..Quincy, Mass.
Great Lakes Engineering Works.....Detroit.

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Bowers, L. M. & Co.....Binghamton, N. Y.
DeGrauw, Aymar & Co.....New York.
Seaboard Steel Casting Co.....Chester, Pa.

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Holzapfel's American Composition Co..New York.

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Cramp, Wm. & Sons.....Philadelphia.
Victor Metals Co.....Braintree, Mass.

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American Ship Building Co.....Cleveland.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works.....Detroit.
Sturtevant, B. F., Co.....Hyde Park, Mass.

ASH EJECTORS.
Great Lakes Engineering Works.....Detroit.

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Hoyt, Dustin & Kelley.....Cleveland.
Kremer, C. E.....Chicago.
MacDonald, Ray G.....Chicago.
Potter & Potter .....Buffalo.
Shaw, Warren, Cady & Oakes.....Detroit.
White, Johnson, McCaslin & Cannon Cleveland.

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Ritchie, E. S. & Sons.....Brookline, Mass.

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New York Belting & Packing Co....New York.

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Boston & Lockport Block Co....Boston, Mass.
Cleveland Block Co.....Cleveland.

BLOWERS.
Sturtevant, B. F. Co. .....Hyde Park, Mass.

BOAT BUILDERS.
Dream, Thos. & Son.....Wilmington, Del.
Kahnweiler's Sons, David.....New York.
Lane & DeGroot ....Long Island City, N. Y.
Marine Construction & D. D. Co.....
.....Mariner's Harbor, S. I., N. Y.
Truscott Boat Mfg. Co....St. Joseph, Mich.
Willard, Chas. P. & Co.....Chicago.

BOILER COMPOUNDS.
Dearborn Drug & Chemical Works....Chicago.

BOILER MANUFACTURERS.
Almy Water Tube Boiler Co.Providence, R. I.
American Ship Building Co.....Cleveland.
Atlantic Works .....East Boston, Mass.
Babcock & Wilcox Co.....New York.
Bertram Engine Works Co., Ltd. .....
..... Toronto, Can.
Chicago Ship Building Co.....Chicago.
Cramp, Wm. & Sons.....Philadelphia.
Delauney, Belleville & Co..St. Denis, France.
Detroit Ship Building Co.....Detroit.
Fletcher, W. A. & Co.....Hoboken, N. J.
Fore River Shipbuilding Co.....Quincy, Mass
Georgian Bay Engineering Works.....
..... Midland, Ont.
Great Lakes Engineering Works.....Detroit.

BOILER MANUFACTURERS—Continued.
Jenks Ship Building Co....Port Huron, Mich.
Kingsford Foundry & Machine Works....
.....Oswego, N. Y.
Marine Iron Works.....Chicago.
Maryland Steel Co..... Sparrows Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Mosher Water Tube Boiler Co....New York.
Newport News Ship Building Co.....
.....Newport News, Va.
New York Shipbuilding Co.....Camden, N. J.
Northwestern Steam Boiler & Mfg. Co....
..... Duluth, Minn.
Roberts Safety Water Tube Boiler Co....
..... New York.
Stirling, The Co.....Chicago.
Superior Ship Building Co....Superior, Wis.
Taylor Water Tube Boiler Co.....Detroit.
Willard, Chas. P. & Co.....Chicago.

BOILER RIVETS.
Bourne-Fuller Co..... ..... Cleveland.

BOILER STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.
Falls Hollow Staybolt Co..Cuyahoga Falls, O.

BOILER TUBES, MARINE.
Reading Iron Co.....Reading, Pa.

BRASS AND BRONZE CASTINGS.
Cramp, Wm. & Sons.....Philadelphia.
Fore River Ship & Engine Co..Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Lunkenheimer Co. .....Cincinnati.
Macbeth Iron Co.....Cleveland.
Victor Metals Co.....Braintree, Mass.

BRIDGES, BUILDERS OF.
Scherzer Rolling Lift Bridge Co....Chicago.

BUCKETS, ORE AND COAL.
Brown Hoisting & Conveying Machine Co.
..... Cleveland.
Macbeth Iron Co. .....Cleveland.
McMyler Mfg. Co..... Cleveland.

CABIN AND CABINET FINISHING WOODS.
Martin-Barriss Co.....Cleveland.

CAPSTANS.
American Ship Windlass Co..Providence, R. I.
Hyde Windlass Co.....Bath, Me.
Marine Mfg. & Supply Co.....New York.

CEMENT, IRON FOR REPAIRING LEAKS.
Smooth-On Mfg. Co.....Jersey City, N. J.

CHAINS.
Lebanon Chain Works.....Lebanon, Pa.
Woodhouse Chain Works.....Trenton, N. J.

CHAIN CONVEYORS, HOISTS.
Brown Hoisting Machinery Co. (Inc.)....
..... Cleveland.
General Electric Co.....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co.....
.....Pittsburg, Pa.

CHAIN HOISTS.
Boston & Lockport Block Co....Boston, Mass.
Dake Engine Co.....Grand Haven, Mich.

CHARTS.
Penton Publishing Co.....Cleveland.
Potter, J. D.....London.

CLOCKS (Marine and Ship's Bell) AND CHRONOMETERS.
Ashton Valve Co.....Boston.
Ritchie, E. S. & Sons.....Brookline, Mass.
Standard Gauge Mfg. Co.....Syracuse, N. Y.

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Hanna, M. A. & Co.....Cleveland.
Pickands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.

COAL AND ORE HANDLING MACHINERY.
Brown Hoisting Machinery Co. (Inc.) ..
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Macbeth Iron Co.....Cleveland.
McMyler Mfg. Co..... Cleveland.

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Ritchie, E. S. & Sons.....Brookline, Mass.

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Holzapfel's American Compositions Co.New York.

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Thropp & Sons Co., John E....Trenton, N. J.

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Contractors Supply & Equipment Co., Chicago.

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Chicago & Gt. Lakes Dredge & Dock Co.
..... Chicago.
Dunbar & Sullivan Dredging Co.....Buffalo.
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Upson-Walton Co.....Cleveland.

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Brown Hoisting Machinery Co.....Cleveland.
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Dunbar & Sullivan Dredging Co.....Buffalo.
Fitz-Simons & Connell Co.....Chicago.
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Smith Co., L. P. & J. A.....Cleveland.
Starke Dredge & Dock Co., C. H...Milwaukee.
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Atlantic Works .....East Boston, Mass.
Buffalo Dry Dock Co.....Buffalo.
Chicago Ship Building Co.....Chicago.
Craig Ship Building Co.....Toledo, O.
Cramp, Wm. & Sons.....Philadelphia.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works.....Detroit.
Lockwood Mfg. Co.....East Boston, Mass.
Milwaukee Dry Dock Co.....Milwaukee.
Newport News Ship Building Co.....
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Shipowners Dry Dock Co.....Chicago.
Superior Ship Building Co....Superior, Wis.

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Fisher Electrical Works.....Detroit.
General Electric Co.....Schenectady, N. Y.
Pawling & Harnischfeger.....Milwaukee.
Westinghouse Electric & Mfg. Co.....
..... Pittsburg, Pa.

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Fisher Electrical Works.....Detroit.
General Electric Co.....Schenectady, N. Y.
Mietz, Aug. .....New York.
Sturtevant, B. F. Co.....Hyde Park, Mass.
Thropp & Sons, John E.....Trenton, N. J.
Westinghouse Electric & Mfg. Co.....
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American Ship Building Co.....Cleveland.
Atlantic Works .....East Boston, Mass.
Bertram Engine Works Co., Ltd. .....
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Chicago Ship Building Co.....Chicago.
Chase Machine Co.....Cleveland.
Cramp, Wm. & Sons.....Philadelphia.
Craig Ship Building Co.....Toledo, O.
Dake Engine Co.....Grand Haven, Mich.
Detroit Ship Building Co.....Detroit.
Fletcher, W. & A. Co.....Hoboken, N. J.
Fore River Shipbuilding Co.....Quincy, Mass.
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Hall Bros. .....Philadelphia.
Jenks Ship Building Co....Port Huron, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Macbeth Iron Co.....Cleveland.
Marine Iron Works ..... Chicago.
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Mietz, Aug. .....New York.
Milwaukee Dry Dock Co.....Milwaukee.
Mosher, Chas. D.....New York.
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Nsw York Shipbuilding Co.....Camden, N. J.
Northwestern Steam Boiler & Mfg. Co....
.....Duluth, Minn.
Roach's Ship Yard .....Chester, Pa.
Sheriffs Mfg. Co.....Milwaukee.
Superior Ship Building Co....Superior, Wis.
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Macbeth Iron Co.....Cleveland.

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Smith Coal & Dock Co., Stanley B.Toledo, O.

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GASKETS, RUBBER.

New York Belting & Packing Co..New York.

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Safety Car Heating & Lighting Co..New York.

GAS AND GASOLINE ENGINES.

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Georgian Bay Engineering Works.....
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Ashton Valve Co.....Boston.
Lunkenheimer Co. .....Cincinnati.
Standard Gauge Mfg. Co.....Syracuse, N. Y.

GAUGES, WATER.

Bonner & Co., Wm. T.....Boston.
Lunkenheimer Co. .....Cincinnati, O.
Standard Gauge Mfg. Co.....Syracuse, N. Y.

GRAPHITE.

Dixon Crucible Co., Joseph..Jersey City, N. J.

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Chase Machine Co.....Cleveland.

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Chase Machine Co.....Cleveland.
General Electric Co.....New York.
Georgian Bay Engineering Works.....
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Hyde Windlass Co.....Bath, Me.
McMyler Mfg. Co.....Cleveland.
Marine Iron Co.....Bay City.
Mietz, Aug. .....New York.
Pawling & Harnischfeger .....Milwaukee.
Westinghouse Electric & Mfg. Co.....
.....Pittsburg, Pa.

HOLLOW STAYBOLT IRON.

Falls Hollow Staybolt Co...Cuyahoga Falls, O.

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Great Lakes Engineering Works.....Detroit.

HYDRAULIC TOOLS.

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Great Lakes Engineering Works.....Detroit.
Roelker, H. B.....New York.

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Jenkins Bros. .....New York.
Lunkenheimer Co. .....Cincinnati.
Penberthy Injector Co.....Detroit, Mich.

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Fleming & Co., P. H.....Chicago.
Frankfort Marine, A. & P. G. Ins. Co....
..... New York.

INSURANCE, MARINE—Continued.

Gilchrist & Co., C. P.....Cleveland.
Hawgood & Co., W. A.....Cleveland.
Helm & Co., D. T.....Duluth.
Hutchinson & Co.....Cleveland.
McCarthy, T. R.....Montreal.
McCurdy, Geo. L.....Chicago.
Mitchell & Co.....Cleveland.
Parker Bros. Co., Ltd.....Detroit.
Peck, Chas. E. & W. F..New York & Chicago.
Prindiville & Co.....Chicago.
Richardson, W. C.....Cleveland.
Sullivan, D. & Co.....Chicago.
Voss, F. D.....New York.

IRON CASTINGS.

Reading Iron Co.....Reading. Pa.

IRON ORE AND PIG IRON.

Bourne-Fuller Co.....Cleveland. O.
Hanna, M. A. & Co.....Cleveland.
Pickands, Mather & Co.....Cleveland.
Reading Iron Co..... .....Reading, Pa.

LAMPS, INCANDESCENT.

Westinghouse Elec. & Mfg. Co.....Pittsburg, Pa.
Sawyer-Man Electric Co. ..... Pittsburg, Pa.

LAUNCHES—STEAM, NAPHTHA, ELECTRIC.

Georgian Bay Engineering Works.....
..... Midland, Ont.
Marine Iron Works.....Chicago,
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Willard, Chas. P.....Chicago.

LIFE PRESERVERS, LIFE BOATS, BUOYS.

Armstrong, Cork Co.....Pittsburg.
Drein, Thos. & Son.....Wilmington, Del.
Kahnweiler's Sons, D. .....New York

LIGHTS, SIDE AND SIGNAL.

Russell & Watson .....Buffalo.

LOGS.

Walker & Sons, Thomas ....Birmingham, Eng.
Also Ship Chandlers.

LUBRICATING GRAPHITE.

Dixon Crucible Co., Joseph..Jersey City, N. J.

LUBRICATORS.

Crane Co. .....Chicago.
Lunkenheimer Co. .....Cincinnati.

LUMBER.

Martin-Barriss Co.....Cleveland.

MACHINISTS.

Chase Machine Co.....Cleveland.
Hickler Bros. .....Sault Ste. Marie, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Macbeth Iron Co.....Cleveland.

MACHINE TOOLS (WOOD WORKING).

Atlantic Works, Inc.....Philadelphia.

MARINE RAILWAYS.

Hickler Bros. .....Sault Ste. Marie, Mich.

MARINE RAILWAYS, BUILDERS OF.

Crandall & Son, H. I....East Boston, Mass.

MATTRESSES, CUSHIONS, BEDDING.

Fogg, M. W.....New York.

MECHANICAL DRAFT FOR BOILERS.

American Ship Building Co.....Cleveland.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works ..Detroit.
Sturtevant, B. F. Co.....Hyde Park, Mass.

METALLIC PACKING.

Katzenstein, L. & Co.....New York.

METAL POLISH.

Bertram's Oil Polish Co.....Boston

MOTORS, GENERATORS—ELECTRIC.

Fisher Electrical Works.....Detroit.
General Electric Co.....Schenectady, N. Y.
Sturtevant, B. F. Co..... Hyde Park, Mass.
Westinghouse Electric & Mfg. Co.....
..... Pittsburg, Pa.

Buyers' Directory of the Marine Trade.—*Continued.*

NAUTICAL INSTRUMENTS.
Ritchie, E. S., & Sons.....Brookline, Mass.

NAUTICAL SCHOOLS.
Chicago Nautical School. ..... Chicago.

NAVAL ARCHITECTS.
Hynd, Alexander .....Cleveland.
Kidd, Joseph.....Duluth, Minn.
Kreer & Parsons. .....Chicago.
Lovejoy, H. O.....Buffalo.
Matteson & Drake.....Philadelphia.
Mosher, Chas. D.....New York.
Nacey, James .....Cleveland.
Rice, Henry .....Buffalo.
Sadler, Perkins & Field.....New York.
Wood, W. J.....Chicago.

OAKUM.
DeGrauw, Aymar & Co.....New York.
Stratford, Oakum Co.....Jersey City, N. J.

OIL ENGINES.
Mietz, Aug. .....New York.

OILS AND LUBRICANTS.
Dixon Crucible Co., Joseph..Jersey City, N. J.
Standard Oil Co.....Cleveland.

PACKING.
Crane Co. .....Chicago.
Jenkins Bros. .....New York.
Katzenstein, L. & Co.....New York.
New York Belting & Packing Co...New York.

PACKING TOOL.
Matteson & Drake .....Philadelphia.

PAINTS.
Baker, Howard H. & Co.....Buffalo.
Detroit Varnish Co.....Detroit.
Detroit White Lead Works.....Detroit.
New Jersey Zinc Co.....New York.
Upson-Walton Co. .....Cleveland.

PATTERN SHOP MACHINERY.
Atlantic Works, Inc.....Philadelphia.

PILE DRIVING AND SUBMARINE WORK.
Buffalo Dredging Co.....Buffalo.
Chicago & Gt. Lakes Dredge & Dock Co..
..... Chicago.
Dunbar & Sullivan Dredging Co.....Buffalo.
Fitz-Simons & Connell Co.....Chicago.
Hickler Bros. .....Sault Ste. Marie, Mich.
Lake Superior Contracting & Dredging Co.,
.....Duluth, Minn.
Parker Bros. Co., Ltd.....Detroit.
Smith Co., L. P. & J. A.....Cleveland.
Starke Dredge & Dock Co., C. H...Milwaukee.
Sullivan, M. .....Detroit.

PIPE, WROUGHT IRON.
Bourne-Fuller Co.....Cleveland, O.
Crane Co. .....Chicago.
Macbeth Iron Co.....Cleveland.
Reading Iron Co.....Reading, Pa.

PLANING MILL MACHINERY.
Atlantic Works, Inc.....Philadelphia.

PLATES—SHIP, STRUCTURAL, ETC.
Bourne-Fuller Co.....Cleveland, O.
Otis Steel Co.....Cleveland.
Reading Iron Co..... .....Reading, Pa.

PNEUMATIC TOOLS.
Allen, John F.....New York.

POLISH FOR METALS.
Bertram's Oil Polish Co.....Boston.

PRESSURE REGULATORS.
Kieley & Mueller .....New York.
Ross Valve Co.....Troy, N. Y.

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American Ship Building Co.....Cleveland.
Atlantic Works .... East Boston, Mass.
Cramp, Wm. & Sons.....Philadelphia.
Detroit Ship Building Co.....Detroit.
Fore River Shipbuilding Co.....Quincy, Mass.
Great Lakes Engineering Works.. Detroit.
Hyde Windlass Co.....Bath, Me.
Jenks Ship Building Co....Port Huron, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Macbeth Iron Co.....Cleveland.
Marine Iron Works ..... Chicago.
Milwaukee Dry Dock Co.....Milwaukee.
Newport News Ship Building Co.....
.....Newport News, Va.
Roelker, H. B.....New York.
Sheriffs Mfg. Co.....Milwaukee.
Superior Ship Building Co....Superior, Wis.
Thropp & Sons Co., J. E.....Trenton, N. J.
Trout, H. G.....Buffalo.

PROJECTORS, ELECTRIC.
General Electric Co.....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co.....
..... Pittsburg, Pa.

PUMPS FOR VARIOUS PURPOSES.
Blake, Geo. F., Mfg. Co.....New York.
Great Lakes Engineering Works Detroit.
Marine Iron Works ....Chicago.
Kingsford Foundry & Machine Works....
..... Oswego, N. Y.

PUNCHES, RIVETERS, SHEARS.
Allen, John F. .....New York.

RANGES.
Russell & Watson .....Buffalo

REFRIGERATING APPARATUS.
Great Lakes Engineering Works.....Detroit.
Roelker, H. B. .....New York.

REGISTER FOR CLASSIFICATION OF VESSELS.
Great Lakes Register .....Cleveland.
Record of American & Foreign Shipping..
.....New York.

REPAIRS—ENGINE AND BOILER.
(See also Boiler Manufacturers and Engine Builders.)
Georgian Bay Engineering Works.....
.....Midland, Ont.

RIVETING MACHINES.
Allen, John F.....New York.

RIVETS, STEEL FOR SHIPS AND BOILERS.
Bourne-Fuller Co.....Cleveland, O.

SAFETY VALVES.
American Steam Gauge & Valve Mfg. Co.
..... Boston.
Ashton Valve Co.....Boston.
Crane Co. .....Chicago.
Lunkenheimer Co. .....Cincinnati.

SAIL MAKERS.
Baker, Howard H. & Co.....Buffalo.
Upson-Walton Co.....Cleveland.

SALVAGE COMPANIES.
See Wrecking Companies.

SCHOOLS—NAVIGATION.
Chicago Nautical School.....Chicago.

SEARCH LIGHTS.
General Electric Co.....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co.....
.....Pittsburg, Pa.

SHEARS.
See Punches, Rivets, and Shears.

SHIP AND BOILER PLATES AND SHAPES.
Bourne Fuller Co.....Cleveland, O.
Otis Steel Co.....Cleveland.
Reading Iron Co.....Reading, Pa.

SHIP BUILDERS.
American Ship Building Co.....Cleveland.
Atlantic Works .....East Boston, Mass.
Bertram Engine Works Co., Ltd.Toronto, Can.
Buffalo Dry Dock Co.....Buffalo.
Cramp, Wm. & Sons.....Philadelphia.
Craig Ship Building Co.....Toledo, O.
Chicago Ship Building Co.....Chicago.
Detroit Ship Building Co.....Detroit.
Fore River Shipbuilding Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Jenks Ship Building Co....Port Huron, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Maryland Steel Co.....Sparrows Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Newport News Ship Building Co.....
.....Newport News, Va.
New York Shipbuilding Co.....Camden, N. J.
Roach's Ship Yard .....Chester, Pa.
Shipowner's Dry Dock Co.....Chicago.
Smith & Son, Abram.....Algonac, Mich.
Willard, Chas. P. & Co.....Chicago.

SHIP CHANDLERS.
Baker, Howard H. & Co.. .....Buffalo.
Marine Mfg. & Supply Co.....New York.
Upson-Walton Co.....Cleveland.

SHIP DESIGNERS.
Kidd Joseph.... .....Duluth.
Kreer & Parsons. .....Chicago.
Matteson & Drake..... ..... Buffalo.
Rice & Lovejoy.....Buffalo
Steel, Nacey & Hynd.... .....Cleveland.
Wood, W. J.....Chicago.

SHIP LANTERNS AND LAMPS.
Russell & Watson .....Buffalo.

SHIP TIMBER.
Martin-Barriss Co.....Cleveland.

SMOOTH-ON COMPOUND, FOR REPAIRS.
Smooth-On Mfg. Co.....Jersey City, N. J.

STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.
Falls Hollow Staybolt Co..Cuyahoga Falls, O.
Reading Iron Co..... .....Reading, Pa.

STEAM VESSELS FOR SALE.
Gilchrist & Co., C. P. .....Cleveland.
Holmes, Samuel .....New York.
Lester, S. S.....Quebec, Can.
McCarthy, T. R.....Montreal, Can.

STEAMSHIP LINES, PASS. AND FREIGHT.
American Line .....New York.
Anchor Line .....Buffalo.
Boston Steamship Co .....Boston.
International Mercantile Marine Co.....
..... Philadelphia.
New York & Cuba Mail S. S. Co.....New York.
Red Star Line .....New York.
United Fruit Co .....Boston.

STEEL CASTINGS.
Macbeth Iron Co.....Cleveland.
Otis Steel Co.....Cleveland.

STEERING APPARATUS.
American Ship Building Co.....Cleveland.
Chase Machine Co.....Cleveland.
Dake Engine Co.....Grand Haven, Mich.
Detroit Ship Building Co.....Detroit.
Hyde Windlass Co.....Bath, Me.
Jenks Ship Building Co....Port Huron, Mich.
Marine Mfg. & Supply Co.....New York.
Moulton Steering Engine Co.....New York.
Pawling & Harnischfeger .....Milwaukee.
Sheriffs Mfg. Co.....Milwaukee.

SUBMARINE DIVING APPARATUS.
Morse & Son, A. J.....Boston.
Schrader's Son, A.....New York.

SURVEYORS, MARINE.
Gaskin, Edward .....Buffalo.
Hynd, Alexander .....Cleveland.
Lovejoy, H. O.....Buffalo.
Matteson & Drake .....Philadelphia.
Parker Bros. Co., Ltd.....Detroit.
Nacey, James .....Cleveland.
Rice, Henry .....Buffalo.
Steel, Adam .....Cleveland.
Wood, W. J.....Chicago.

TESTS OF MATERIALS.
Hunt, Robert W. & Co.....Chicago.

TILING, INTERLOCKING RUBBER.
New York Belting & Packing Co...New York.

TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.
Allen, John F.....New York.
Watson-Stillman Co.....New York.

TOOLS, WOOD WORKING.
Atlantic Works, Inc.....Philadelphia.

TOWING MACHINES.
American Ship Windlass Co..Providence, R. I.
Chase Machine Co.....Cleveland.

TOWING COMPANIES.
Donnelly Salvage & Wrecking Co.....
.....Kingston, Ont.

TRAPS, STEAM.
Kieley & Mueller .....New York.
Sturtevant Co., B. F., ...Hyde Park, Mass.

TRUCKS.
Boston & Lockport Block Co.....Boston.

TUBING, SEAMLESS.
Shelby Steel Tube Co.....Pittsburg, Pa.

Buyers' Directory of the Marine Trade.—*Continued.*

VALVES, STEAM SPECIALTIES, ETC.

American Steam Gauge & Valve Mfg. Co. ..... Boston.
Ashton Valve Co. ..... Boston.
Crane Co. ..... Chicago.
Jenkins Bros. ..... New York.
Kieley & Mueller ..... New York.
Lunkenheimer Co. ..... Cincinnati.
Ross Valve Co. ..... Troy, N. Y.

VALVES FOR WATER AND GAS.

Lunkenheimer Co. ..... Cincinnati.
Ross Valve Co. ..... Troy, N. Y.

VARNISHES.

Detroit Varnish Co. ..... Detroit.
Detroit White Lead Works ..... Detroit.
New Jersey Zinc Co. ..... New York.
Also Ship Chandlers.

VENTILATING APPARATUS FOR SHIPS.

Sturtevant, B. F. Co. ..... Hyde Park, Mass.

VESSEL AND FREIGHT AGENTS.

Boland, John J. ..... Buffalo.
Brown & Co. ..... Buffalo.
Elphicke, C. W. & Co. ..... Chicago.
Fleming & Co., P. H. ..... Chicago.
Gilchrist & Co., C. P. ..... Cleveland.
Hall, John B ..... Buffalo.
Helm & Co., D. T. ..... Duluth.

VESSEL AND FREIGHT AGENTS—Con.

Hawgood & Co., W. A. ..... Cleveland.
Holmes, Samuel ..... New York.
Hutchinson & Co. ..... Cleveland.
Lester, S. S. ..... Quebec, Can.
McCarthy, T. R. ..... Montreal.
Mitchell & Co. ..... Cleveland.
Parker Bros. Co., Ltd. ..... Detroit.
Prindiville & Co. ..... Chicago.
Richardson, W. C. ..... Cleveland.
Sullivan, D. & Co. ..... Chicago.

WATER GAUGES.

Bonner & Co., Wm. T. ..... Boston
Lunkenheimer Co. ..... Cincinnati, O.

WIRE ROPE AND WIRE ROPE FITTINGS.

Baker, H. H. & Co. ..... Buffalo.
DeGrauw, Aymar & Co. ..... New York.
Upson-Walton Co. ..... Cleveland.

WHISTLES, STEAM.

American Steam Gauge & Valve Mfg. Co. ..... Boston.
Ashton Valve Co. ..... Boston.
Lunkenheimer Co. ..... Cincinnati.

WINDLASSES.

American Ship Windlass Co. . Providence, R. I.
American Ship Building Co. ..... Cleveland.
Hyde Windlass Co. ..... Bath, Me.
Jenks Ship Building Co. ... Port Huron, Mich.
Marine Mfg. & Supply Co. ..... New York.

WINCHES.

American Ship Windlass Co. . Providence, R. I.
Georgian Bay Engineering Works. ..... Midland, Ont.
Hyde Windlass Co. ..... Bath, Me.

WOOD WORKING MACHINERY.

Atlantic Works, Inc. ..... Philadelphia.

WRECKING AND SALVAGE COMPANIES.

Donnelly Salvage & Wrecking Co. ..... Kingston, Ont.
Parker Bros. Co., Ltd. ..... Detroit.

YACHT AND BOAT BUILDERS.

Bertram Engine Works Co., Ltd. . Toronto, Can.
Drein, Thos. & Son ..... Wilmington, Del.
Georgian Bay Engineering Works. ..... Midland, Ont.
Truscott Boat Mfg. Co. ..... St. Joseph, Mich.
Willard, Chas. P. & Co. ..... Chicago.

YAWLS.

Drein, Thos. & Son ..... Wilmington, Del.

ALPHABETICAL INDEX OF ADVERTISERS IN THE MARINE REVIEW.

The star (*) indicates that the advertisement appears alternate weeks. For addresses see advertisements on pages noted.
The dagger (†) indicates that advertisement appears once a month.

LAKE SHORE AND MICHIGAN SOUTHERN RY.

Eastward	Arrive from West	Depart East
No. 18, Southwestern Limited	.....	*1:50 a.m.
No. 22, Lake Shore Limited	*2:12 a.m.	*2:20 a.m.
No. 20, Chicago and Cleveland Exp.	*7:20 a.m.	.....
No. 28, New York and Boston Exp.	*7:40 a.m.	*8:00 a.m.
No. 40, Toledo and Buffalo Accom	†10:00 a.m.	†10:30 a.m.
No. 32, Fast Mail	*11:25 a.m.	*11:30 a.m.
No. 48, Accommodation via Sandusky	†1:40 p.m.	.....
No. 42, Boston–New York Express	.....	*11:45 a.m.
No. 44, Cleveland and New York Spl.	.....	*3:00 p.m.
No. 46, Southwestern Express	.....	*3:10 p.m.
No. 116, Ashtabula Accommodation	.....	†4:30 p.m.
No. 6, Limited Fast Mail	*5:40 p.m.	*5:45 p.m.
No. 26, 20th Century Limited	*7:40 p.m.	*7:43 p.m.
No. 10, Chicago, N.Y. & Boston Spl.	*7:30 p.m.	*7:50 p.m.
No. 16, New England Express	*10:30 p.m.	*10:35 p.m.
No. 2, Day Express	†9:10 p.m.	†9:25 p.m.
No. 126, Norwalk Accommodation	†7:55 a.m.	.....

Westward	Arrive from East	Depart West
No. 7, Exposition Limited	*12:50 a.m.	.....
No. 11, Southwestern Limited	*2:55 a.m.	.....
No 9, Day Express	.....	†6:10 a m.
No. 15, Boston and Chicago Special	*3:10 a.m.	*3:15 a.m.
No. 19, Lake Shore Limited	*7:15 a.m.	*7:25 a.m.
No. 23, Western Express	*10:30 a.m.	*10:35 a m.
No. 29, Southwestern Special	‡11:10 a.m.	.....
No. 33, Southwestern Express	*12:25 p.m.	.....
No. 133, Cleve and and Detroit Exp.	.....	*12:45 p.m.
No. 47, Accommodation	†11:00 a.m.	†3:00 p m.
No. 141, Sandusky Accommodation	.....	†3:10 p.m.
No. 43, Fast Mail	*4:35 p.m.	*4:40 p.m.
No. 127, Norwalk Accommodation	.....	†5:10 p.m.
No. 37, Pacific Express	*6:50 p.m.	*7:20 p m.
No. 3, Fast Mail Limited	*10.50 p.m.	*10:55 p.m.
No. 115, Ashtabula Accommodation	*8.30 a.m.	.....

*Daily. †Except Sunday. ‡Except Monday.
Trains Nos. 23, 28 and 37 run via Erie Station.
City Ticket Office, 237 Superior St